Aalto University
School of Business

SUSTAINABLE INVESTING

Moving from compliance and risk management to creating societal impact

Master's Thesis
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Abstract of master's thesis

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Abstract

This thesis aims to provide a comprehensive analysis of the connection between sustainable investing, corporate sustainability and sustainable development. Growing environmental and social concerns have increased the role of sustainability in society. Due to this development, sustainable investing has gained popularity and it has become a mainstream investment strategy for large institutional investors. Sustainable investing integrates environmental, social and governance factors into investment process aiming to improve the risk-return profile of the investment.

This thesis builds a theoretical framework to assess companies' sustainability performance based on their ESG footprint and ESG handprint performance. Footprint refers to negative impacts and externalities caused by business activities. Handprint refers to positive impacts that companies are able to create through their core business, especially through their products and services. To my best knowledge, this study is the first one to present a framework, which separates companies' ESG performance based on the footprint and handprint dimensions. Moreover, this thesis provides an overview of existing literature around corporate sustainability and sustainable investing.

To test empirically the framework, I obtain ESG data from Thomson Reuters and build a sample covering the years from 2003 to 2018 using stocks that are listed in the STOXX600 Europe index. By utilizing ESG scores, I create footprint and handprint scores for each company in the sample to assess stock market performance based on these scores. I utilize a portfolio study methodology and Fama-French three-factor model to analyze whether ESG data provides value relevant information for investors. I create four portfolios by classifying stocks based on their footprint and handprint scores. I find that portfolio including stocks with high ESG footprint score and low ESG handprint score creates excess returns of 0.387% at 1% level. Other three portfolios create also a positive but insignificant excess returns. This signals that investors receive value relevant information by utilizing especially ESG data considering stocks' ESG footprint performance. Moreover, I found that those stocks that have improved their ESG ratings during the past 12-months outperform the market. High-ESG portfolios create excess returns of around 0,5% at 1% level, and this finding holds whether using ESG total scores, ESG footprint scores or ESG handprint scores.

Keywords Sustainable investment, ESG, sustainable development, sustainability, sustainable business, footprint, handprint

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Tiivistelmä

Tämän tutkielman tavoitteena on muodostaa kattava kuva vastuullisen sijoittamisen, kestävän liiketoiminnan sekä kestävän kehityksen välisestä yhteydestä. Kasvavat ympäristölliset ja sosiaaliset haasteet ovat lisänneet vastuullisuuden ja kestävyyden roolia yhteiskunnassa. Tämän kehityksen vuoksi vastuullinen sijoittaminen on kerännyt suosiota ja se on valtavirtaistunut institutionaalisten sijoittajien sijoitusstrategiana. Vastuullinen sijoittaminen sisällyttää ympäristöön, sosiaalisiin ja hallintotapaan (ESG) liittyvät asiat osaksi sijoitusprosessia tuotto-riski profiilin parantamiseksi.

Tutkielma muodostaa teoreettisen viitekehikon, jonka avulla yritysten vastuullisuussuoriutumista voidaan arvioida pohjautuen suoriutumiseen ESG-jalanjäljessä sekä ESG-kädenjäljessä. Jalanjälki viittaa yritystoiminnan aiheuttamiin negatiivisiin vaikutuksiin ja ulkoisvaikutuksiin. Kädenjälki viittaa yritystoiminnan aikaansaamiin positiivisiin vaikutuksiin osana yrityksen ydinliiketoimintaa, erityisesti tuotteiden ja palveluiden kautta. Parhaan tietämykseni mukaan tämä on ensimmäinen tutkimus, joka esittää viitekehyksen erottaen yritysten suoriutumisen ESG-jalanjäljen ja ESG-kädenjäljen osalta. Lisäksi tutkielma esittää yleiskuvan olemassa olevasta tutkimuksesta liittyen kestävään liiketoimintaan ja vastuulliseen sijoittamiseen.

Hyödynnän Thomson Reutersin ESG-pisteytyksiä testatakseni viitekehystä empiirisesti ja rakennan aineiston sisältäen STOXX600 Europe indeksin sisältämät yritykset vuosilta 2003-2018. Hyödyntämällä ESG-pisteytyksiä muodostan jalanjälki- ja kädenjälki-pisteytykset jokaiselle osakkaalle ja tarkastelen niiden osakekurssilla mitattua suoriutumista näiden pisteytysten perusteella. Hyödynnän portfoliotutkimusmenetelmää ja Fama-French kolmen faktorin mallia analysoidakseni ESG-pisteytysten arvorelevanssia. Muodostan neljä portfoliota jakamalla osakkeet jalanjälki- ja kädenjälki-pisteytysten mukaisesti. Tulokset osoittavat, että portfolio joka sisältää osakkeita, joilla on korkea jalanjälki-pisteytys ja matala kädenjälki-pisteytys tuottaa 0.387% epänormaalin tuoton tilastollisesti merkittävästi. Myös muut kolme portfolio tuottavat epänormaalia tuottoa, mutta ei tilastollisesti merkittävästi. Tämä signaloi, että sijoittaja saa arvo-relevanttia tietoa ESG-pisteytyksiä erityisesti ESG-jalanjäljen osalta. Lisäksi osakkeet, jotka ovat parantaneet ESG-pisteytystään viimeisen 12 kuukauden aikana päihittävät markkinan. Portfoliot sisältäen korkean ESG-pisteytyksen osakkeita tuottavat 0.5% tilastollisesti merkittävän tuoton.

Avainsanat Vastuullinen sijoittaminen, ESG, kestävä kehitys, vastuullisuus, kestävä liiketoiminta, jalanjälki, kädenjälki

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1. INTRODUCTION

1.1. Background and motivation

> "To prosper over time, every company must not only deliver financial performance, but also show how it makes a positive contribution to society. Companies must benefit all of their stakeholders, including shareholders, employees, customers, and the communities in which they operate."
>
> *Larry Fink's 2018 Letter to CEOs – A Sense of Purpose* [1]

The year 2018 stands for 10th year anniversary for global financial crisis in 2008. The crisis affected the entire global economic system and had severe impacts, both financially and socially. What started as a crisis in the subprime mortgage market in the US, spread through the financial system and developed into an international banking crisis. A culmination point of the crisis was the collapse of the investment bank Lehman Brothers on September 15, 2008, which caused a domino effect and launched massive bail-outs to prevent a total failure of the financial system. The reasons behind the global financial crisis are manifold, including excessive risk-taking and unhealthy incentives, increased debt burden and overleveraging, lack of transparency and poor corporate governance, insufficient regulation and supervision of the financial sector, to name a few. (The Financial Crisis Inquiry Commission, 2011) Many of these issues raises a question of what is right and wrong – and when examining the reasons behind the crisis, one can argue that one of the main root causes of the crisis was moral and ethical failures across the financial industry.

In the aftermath of the crisis, there has been plenty of regulatory proposals and other actions to prevent the same kind of crisis to happen again. Nevertheless, more importantly, there has been a long waited discussion of the role of financial markets as well as financial institutions and other corporations in our economy and in our society. When financial markets fail to do their job

[1] Larry Fink, the CEO of BlackRock, publishes annually an open letter to CEOs. The 2018 letter called "A Sense of Purpose" has gained enormous attention within the financial sector. In his letter, Larry Fink discusses about the role of private sector to respond to broader societal challenges and states that companies need to create long-term strategies and enhance long-term value creation by connecting their core businesses to the broader societal and stakeholder needs.

properly, they can cause enormous harm as the financial crisis showed us. However, financial markets have played an important role during the recent centuries to enable the economic growth and growth of wellbeing.

The Bank of England provides a simple and accurate definition for financial markets: “Financial markets bring people together so money flows to where it is needed most”. (Bank of England, 2019) The role of financial markets serving society’s needs has never been more important than today as we face serious environmental and social challenges, including e.g. climate change, loss of biodiversity, rabid deforestation, lack of water and food, and increased social inequality. Collective ability to respond to these global challenges highlights the role of well-functioning financial markets as the investments needed to solve these problems are massive.

One important question to understand is why we are facing these challenges at the first place. First of all, as financial crisis showed us, focusing solely on short-term interest and not paying attention to the longer-term impacts certain actions might have, ultimately has a high probability to cause unwanted outcomes. Optimizing for a whole is always much harder than optimizing only for a small group of people or entities. In addition, when the longer-term outcome affects other people and broader society, not directly the actor itself, we can observe a clear conflict of interest between different parties making this issue also an ethical question, as was the case with the financial crisis. Secondly, even though financial markets have enabled fast economic growth in the past, it is good to observe the mechanics behind and eventually the hidden costs of this economic growth for the broader society and the people.

The illusion of continuous growth is dangerous. Despite of that, continuous growth has been the key economical narrative during the last 200 hundred years after the industrial revolution. At first, this growth brought the society enormous benefits and increased the wellbeing of individuals, but eventually the link between economic growth and increase in individual’s wellbeing has turned to be weaker than generally thought. (The World Economic Forum, 2014) As Tomas Sedlacek argues in his book Economics of Good and Evil, it is in human nature to desire always more and therefore supply cannot ever meet the growing demand. He continues to state that consumption behaves like a drug and demand simply creates new demand. Tomas Sedlacek sees this as a failure of equilibrium economics and presents two ways to minimize the gap between supply and demand:

first, the Hedonist way and never-ending story to increase the supply of goods until it satisfies our demand, and secondly, the Stoic way to decrease demand to meet your existing supply.

Our economic system has been built on the first, Hedonist, way. As a reason we have seen countries' economic activity measured by the GDP to grow remarkably during the last centuries, while at the same time, multinational corporations (MNCs) have growth significantly to meet the increasing global demand. Currently world's largest corporations are bigger than many national economies. According to the 2018 statistics, "157 of top 200 economic entities by revenue are corporations not countries" (Global Justice Now, 2018). This highlights the relative power of the multinational corporations in our economic system.

On the other hand, it highlights also the responsibilities these MNCs have in the modern world due to their potential negative and positive impacts towards our society. As stated earlier, globalization and industrialization have gained enormous economic benefits to the society but it is vital to understand that it has come with a price. Much of the economic growth has happened by exploiting natural resources and eventually causing negative environmental and social impacts. Fatemi and Fooladi (2013) state that "an emphasis on short-term results has had the unintended consequence of forcing many firm to externalize their social and environmental costs". On the other words, companies have pursued actions that generate (short-term) profits but do not have considered potential negative impacts of business activities and the long-term value creation from the societal point of view at the same time.

The externalities and negative impacts of the business activities have been largely neglected and this has had severe consequences both for the people and for the planet. By not acknowledging the material limits of our planet, different economic activities have contributed largely to several negative outcomes. Climate change is the most evident negative outcome of the economic growth as the growth has been largely based on exploiting fossil fuels. However, the extensive use of resources has led also to many other negative consequences. [2] In addition, the social consequences are also remarkable. For example, the supply chains of MNCs are complex and companies have problems to understand the potential negative social impacts related to human rights in the

[2] These negative consequences are presented in more detail in the chapter 2.3. Global sustainability challenges.

countries their suppliers operate, which eventually can lead to human rights violations along the supply chain. (Human Rights Watch, 2016)

In this thesis, I am not arguing that business is bad. Rather, this thesis focuses on the observation that *business as usual* has gone to an end of an era. Supporting our modern lifestyle and ever-growing demand, we would need production that is not possible to meet without compromising planet's limited resources in excess. As the natural resources are already diminishing and under pressure, the situation will become even more adverse as the current world population of 7.6 billion is expected to rise to 9.8 billion in 2050 (United Nations, 2017). Currently, based on the global consumption of the natural resources, we use 1.7 planets every year according to WWF (Living Planet report, 2018). In Finland, the respective number for the year 2019 is 3.8 meaning that we used our share of natural resources by 5th of April. (WWF, 2019)

To tackle these challenges, we need drastic changes in our consumption and production patterns, more efficient ways to fill the needs of many and to understand that our societal system is dependent on natural capital as much as it is dependent of financial capital. As stated earlier, it is in human desire always to want more, and our economy has been built around that idea. Changing how our economic system works can be burdensome, but on the other hand, we are seeing currently many trends towards more sustainable society and sustainable economy. As a result, the implications to corporations, individual investors as well as financial markets as a whole, will be significant and important to understand. This thesis aims to provide an overview of the link between sustainability and financial markets, both from the historical point of view but also considering the potential future implications for the investors.

As Bank of England defines, financial markets allows money to flow where it is needed most. At the same time, it has become more evident that different stakeholders, including investors, regulator, and consumers, have started to consider what that money flowing through financial markets cause in the real economy and in the lives of people affected by the money flow. These stakeholders are more and more concerned of the real impacts that the money cause – both the negative impacts and the positive impacts towards society. As corporations, investors and financial market in broad have a major role in our economies, it is mandatory that those key institutions align the way how they operate with greater societal goals.

During the past decades, sustainability has gained momentum and has become issue that corporations and investors are not able to bypass. This trend is largely driven by the strong environmental movement but on the other hand, also social issues are more and more in the focus of different stakeholders. Examples of well-known environmental risks are found for example in the oil industry. The oil spill of Exxon Valdes in Alaska in 1989 and the explosion of the British Petrol's oil rig Deepwater Horizon in the Gulf of Mexico in 2010 are well-known by the public. Social problems considering for example human rights have increased as globalization has made long supply-chains and using of distributors in low-income countries more common. For example, companies like Apple and Nike have been accused of acting irresponsible. (Arthur C., 2012) There are also several notable governance issues that have been highly influential to the companies and respectively to their investors. In the early 2000s Enron and Worldcom were accused of accounting fraud and giving false information to the investors, leading to decreased share price and major losses for the investors (Stanford GSB, 2003). More recently, in 2015, German auto manufacturer Volkswagen admitted to falsifying emissions tests and on the aftermath of the scandal, millions of cars were recalled from the customers (Delfs, 2015).

These examples are one hand linked to the ability to regulate companies, but on the other hand, companies as well as investors have noted that by voluntarily considering more sustainable business practices and both negative and positive impacts of the business, is eventually good for business and profits also. One important consideration is the increase in the importance of company's stakeholders. The traditionally dominated shareholder approach has been challenged by the stakeholder approach. Based on that view companies need to earn their license to operate, and the requirements to earn this license have become stricter. (Smith, 2003) In addition, the regulation is tightening, consumers are demanding more sustainable business practices and also companies themselves are implementing stricter demands towards other companies along their value chain.

As sustainability has gained momentum and become one of the key trends shaping the society, and respectively the operating environment of companies, this has led to changes in how companies operate. Large number of companies have integrated sustainability as a central part of their strategies and operations. For example, Finnish forest company UPM, has built its strategy around bioeconomy aiming to replace fossil fuels by innovating new sustainable bio-based solutions as an

alternative to fossil fuels. Moreover, Finnish company Neste has developed renewable diesels and become a market leader globally in this area, while being simultaneously ranked as a number one world's most sustainable energy company (Neste, 2019).

The growing trend of sustainability has also influenced the financial markets and investors. During the past 10 years, sustainable investing [3] has become mainstream. Sustainable investing refers to integrating environmental, social, and governance (ESG) factors into investment process. The growth of sustainable investing market has been fast and is strongly driven by the institutional investors. In the United States, $12 trillion of all professionally managed assets, were under ESG investment strategies in the beginning of 2018. This represents one fourth of the total US assets under professional management. Since 1995, the market size of responsible investing has increased 18-fold with a compound annual growth rate of 13.6 percent. (GSIA, 2018)

The growing importance of sustainability considerations has changed how investors evaluate companies and value potential investments. Companies disclose increasingly both voluntary and mandatory ESG data to provide information for investors about their sustainability performance and governance. Non-financial analysis including ESG factors has become important aside of the more traditional financial analysis. The traditional view on incorporating ESG information into investment process has focused heavily on its role in to manage risks, decrease costs by operations that are more efficient as well as protecting the brand of a company (i.e. better reputation). (MSCI 2017) From the investor point of view, one example of integrating sustainability considerations into investment process is the climate change. BlackRock, one of the most famous investment institutes in the world, published an article in August 2016 with the topic "Adapting portfolios to climate change – Implications and strategies for all investors" (BlackRock, 2016). The main message of that report is that climate factors have been underappreciated and underpriced, and that all investors should incorporate climate change awareness into their investment processes. Since the year 2016, the investor interest toward climate change and its implications to financial markets has further gained significant momentum. One of the key drivers has been the work by the Task Force on Climate-related Financial Disclosures (TCFD).

[3] In this thesis I use term 'sustinable investing' to describe investments that integrate ESG factors into investment process. See chapter 2.1. Terminology for further information.

By investing to companies operating sustainable, it is possible to positively benefit society as well. Interesting question both in academics and in practice has been for decades if sustainability considerations leads to increased or decreased operational performance and market valuation for the companies, i.e. whether sustainability actions create or destroy value. Early evidence from the 1970-1990s show that there is no significant relationship between company's social performance and financial performance, and overall the results have been mixed. However, recently there is more and more evidence that companies with high ESG performance can outperform their low performing counterparts. (Friede et al. 2015) In addition, lately the financial materiality of ESG factors has become a popular topic in discussion. Financial materiality answers to the question, which ESG issues are the most important for the company's performance. U.S Based organization Sustainability Accounting Standards Board (SASB) has identified material ESG issues for different industries. Earlier mixed results might be explained by the fact that not all ESG data is financially material and thus does not affect valuations of the companies.

As explained earlier, ESG as an investment approach has largely focused on compliance and risk management. To challenge this view, Phillips et al. (2015) present the handprint approach in an article published in a book called Responsible investment banking: risk management frameworks, sustainable financial innovation and soft law standards. They argue that the societal challenges will only increase during the next 15 years and subsequently increase the stakeholder pressure towards different industries and financial institutions. As an outcome of the changes, they argue that value creation is redefined, and that mitigating negative social and environmental footprint will not be enough in the near future. To continue their argument, they see instead that companies need to be able to create and communicate their social value added. They call this social value added as a handprint. On the other words, the authors see that is crucial to expand the concept of ESG from compliance and risk management view and on managing company's own ESG performance to the broader, future-looking, positive societal impact of their core business actions, especially in the form of the products and services they provide to the market. Business need to be able to manage and consider both their own footprint as well as handprint, and this will also change how investors see the companies.

The opening quote of this thesis by Larry Fink, the CEO of BlackRock, catches the same notion of the growing importance of companies to create broader value for a broader group of stakeholders

than traditionally has been the case. On the other words, companies are expected to improve their handprint to reclaim their social-license-to-operate. This change is driven by the global mega trends and challenges we are facing and the growing role of companies in our economies. Moreover, ESG as a source of innovation and a source of new business opportunities for companies has become more evident, and many companies have already seized these opportunities. Most importantly, ESG as a strategic lens may offer companies a tool to understand the changing operating environments and its implications for the business and business models. Environmental and social challenges can be turned to new business opportunities by aligning business to consider and solve these challenges. As these challenges are out of scale that we have previously faced, also the old solutions are not enough. Traditionally, it has been the role of governments to tackle social challenges, but today their ability to do so is not enough. The role of private sector has become increasingly important as well as collaboration over traditional boundaries of public, private and third sector.

As all economic activity has positive and negative impacts, in the future it will be more and more important that companies are able to minimize their own negative impacts (i.e. footprint) and maximize broader positive impacts (i.e. handprint). By doing so, the forerunner companies can show to wide group of different stakeholders that their positive contribution towards society is bigger than the harm they cause to generate it. This will be growingly important for companies to claim their social-license-to-operate also in the future. The changing notion of value creation by companies, and its implications to investors, will be at the heart of this thesis.

1.2. Research objective

This thesis provides a comprehensive understanding of the connection between sustainable investing, corporate sustainability and sustainable development. In more detail, this thesis aims to i) discuss about companies' role in the society and the link between sustainability and companies as well as the link between sustainability and financial market, ii) provide understanding why good sustainability (ESG) performance can improve companies financial and operational performance and analyze the previous academic research, and finally iii) contribute to the existing literature by presenting the concepts of business footprint and business handprint, and building a theoretical

framework to connect these two dimensions. The concepts of footprint and handprint have not been presented in the previous literature covering sustainable investing. For that reason, this thesis aims to create and understanding why a new mindset focusing on both the business footprint and business handprint should be introduced and deployed. By mitigating negative impacts while maximizing positive impacts, business is able to connect itself with sustainability.

To achieve the goals of this thesis, I start by briefly introducing the concept of sustainability in general, its emergence as one of the key trends shaping our society as well as the main sustainability challenges affecting the society today. I link the general concept of sustainability to the financial markets by covering the origins of sustainable investing and its status as one of the most dominant trends shaping the financial industry. In addition, I discuss shortly the on-going developments in the financial market aiming to integrate sustainability even more deeply into the core of financial markets as this will have notable implications for investors in the future. To build the framework presented in this thesis and as companies are the objects of sustainable investing, it is in great importance to review the literature of corporate sustainability *(or corporate social responsibility, CSR)* to understand how and why sustainability has become a key consideration for all businesses despite of the industry they operate. This discussion is linked to a broader and topical question of the role of a company in society by introducing the literature around shareholder and stakeholder views. I continue by reviewing the existing empirical evidence on the value relevance of ESG performance in the capital markets as well as the link between companies' higher ESG performance and cost of capital as well as the link between higher ESG performance and risk and volatility.

After providing the basic understanding of the responsible investing and existing empirical evidence regarding the topic, I build a framework to present the complementary approaches of business footprint and business handprint. My aim is to highlight the difference of companies mitigating their own negative impacts towards society by acting responsible and mitigating ESG risks in their operations and, on the other hand, companies creating broader social value through their products and services while considering the needs of different stakeholders and answering to social needs. As companies have an important role in society, it is expected that different stakeholders expect more and more that companies are able to minimize their footprint and maximize their handprint.

This thesis sheds light to this discussion and aims to provide empirical evidence whether there is a difference in stock market returns when investing in companies with different footprint-handprint profiles. To test empirically the framework, I obtain ESG data from Thomson Reuters and build a sample covering the years from 2003 to 2018 using stocks that are listed in the STOXX600 Europe index. By utilizing ESG scores, I create footprint and handprint scores for each company in the sample to assess stock market performance based on these scores. I utilize a portfolio study methodology and Fama-French three-factor model to analyze whether ESG data provides value relevant information for investors. I create four portfolios by classifying stocks based on their footprint and handprint scores and assess their performance. Moreover, I test the 'ESG momentum strategy' indicating that those companies that improve their ESG ratings can outperform their counterparts who face declining ESG ratings.

Motivated by the growing importance of sustainability in the society due to environmental and social challenges we face, and the important role of companies and investors in contributing, either negatively or positively, to these challenges through their core business and investment activities, I aim to answer to the following questions in this thesis:

1. To what extent existing academic research has focused on the connection between sustainable investing, corporate sustainability, and sustainable development; and why ESG performance might affect companies' financial performance?
2. Do companies that have high ESG performance measured by their ESG ratings outperform their low ESG performance counterparts and the market index?
3. Is there differences when comparing companies' ESG performance based on ESG total scores, ESG footprint scores and ESG handprint score? If yes, what reasons may cause these differences?

1.3. Contribution to the existing literature

The relationship between sustainability and financial markets is a current topic, and gaining all the time more attention as sustainable finance is becoming a norm in the industry. The academic research on this topic is broad and a lot of effort has been put to understand what sustainability means in the context of investing and asset management. Especially the focus of the previous

research has been on the value relevance of ESG information trying to answer whether ESG considerations in the investment process lead to value creation or not. However, despite of growing interest towards sustainable investing, the academic research on this topic is uncomprehensive and lacks connection to 1) the recent developments and trends affecting both companies and investors and 2) to the other important academic fields studying sustainability and sustainable development. Overall, the academic discussion related to sustainable investing has been isolated from the research and discussion related to matters outside of financial markets as explained by Linnenluecke et al. (2013). For example, the research on sustainable investing is quite isolated and topics like climate change and connections related to the environment and society are not concerned thoroughly in existing research sufficiently.

One reason why academic research can be seen uncomprehensive is the fact that sustainable investing and concept of sustainability in general is changing and evolving with a fast space. One example of academics falling behind is the notion that there is still on-going debate around the question of what is the right term to describe investment actions taking into account also non-financial matters. In the chapter 2.1. I discuss the terminology and explain why I use term 'sustainable investing' in this thesis. Also as companies do not operate in silos, but impact and are impacted by the society around them, it is important to understand the bigger picture considering societal and macro level. This thesis adds to the existing literature by providing a comprehensive view on how and why it is important for companies and investors to consider sustainability issues in their decision-making and operations.

Most importantly, this thesis has two key contributions to the existing literature. First, to my best knowledge, the concepts of business footprint and business handprint have been mostly missing in the academic discussion. This thesis adds to the existing literature by presenting a framework of footprint approach and handprint approach and explaining why it is important to make difference between these two approaches. Second, by utilizing this framework, I am able to empirically test if footprint and handprint dimensions convey value relevant information for investors. To my best knowledge, this is a first study to apply this kind of framework and utilize ESG scores separately for business footprint and business handprint. By utilizing the dataset and sample used in this thesis, I am also able to test existing findings with most up to date ESG data available. Despite of some of the limitations in the data, especially regarding the handprint dimension, I do my best in this

thesis to build a model, which can be tested empirically and can provide motivation for further research utilizing the same approach.

Finally, I consider that it is in great urgency that different parties in the society start to collaborate more in order to tackle the sustainability challenges as these challenges present complex issues that are impossible to be solved without collaboration over traditional boundaries between companies, industries, financial institutions and researchers. Moreover, financial markets and investors will be the key players to contribute to make the world more sustainable, and thus it is important that there are information available. I believe this thesis can provide a solid summary on the link between sustainability and financial markets and to contribute to future academic research by introducing the concepts of business footprint and business handprint as a framework to analyse how sustainable companies truly are.

1.4. Main results

In this thesis, the hypothesis that I test empirically, examine whether high-ESG companies outperform their low-ESG counterparts and the market index; and whether there is a differene when measuring the ESG performance based on ESG total score, ESG footprint score, or ESG handprint score. By utilizing the framework, which will be presented in the Chapter 5, I am able to understand whether ESG footprint and ESG handprint dimensions contain value relevant information.

The main findings of the empirical part of the thesis are as follows. First, when measured by only the ESG total score, there is no evidence that higher ESG performance leads to outperformance of low performing counterparts. However, by utilizing ESG footprint scores, investor will have higher alpha than by using ESG total scores. According to this observation, one of the key findings of this thesis is that investors are able to achieve a better risk-return profile for their portfolio by focusing on companies that are able to minimize the negative impacts of their operations. This is done by analyzing the companies by their ESG footprint score as presented in this thesis.

Moreover, when constructing four portfolios classified as 1) high-handprint, high-footprint, 2) high handprint, low-footprint, 3) low-handprint, high footprint, and 4) low-handprint, low-footprint, I find that portfolio including stocks with high ESG footprint score and low ESG handprint score

creates excess returns of 0.387% at 1% level. Other three portfolios create also a positive but insignificant excess returns. This signals that investors receive value relevant information by utilizing especially ESG data considering stocks' ESG footprint performance.

Second, this thesis provides evidence that those companies that improve their ESG performance will be rewarded by the stock market. By selecting those companies into portfolio that have increased their ESG scores the most during the previous year, will earn an alpha of around 0.5% with 1% significance level. This finding holds when using either ESG total score, ESG footprint score or ESG handprint score, and signals that increasing performance regarding ESG is linked to positive stock market performance.

Finally, this thesis provides evidence that companies with higher ESG footprint score are less risky compared to those companies with low ESG footprint score. As explained by the framework presented in this thesis, companies invest into ESG footprint in order to improve their risk management. The empirical evidence provides support for this argument. On the other hand, the findings are opposite regarding ESG handprint, which is associated to higher risk. Overall, it seems that ESG handprint score does not include as valueable information as ESG footprint score.

1.5.Structure

The paper is constructed as follows. In section 2, I am going to provide a brief overview of sustainability and sustainable investments. I will discuss the emerging of these issues and where they stand today. Literature review covering existing academic research related to corporate sustainability, stakeholder theory and ESG value relevance is covered in section 3. Section 4 presents previous empirical evidence on ESG value relevance and how ESG can affect cost of capital as well as risk and volatility. Chapter 5 presents, my hypothesis and the dataset and sample I utilize in this thesis. Section 6 covers the methodology and the empirical results of my thesis as well as discussion of these results. Finally, section 7 concludes this paper.

2. SUSTAINABILITY AND CAPITAL MARKETS

2.1. Terminology

Terms sustainable investing, ESG, sustainability, sustainable development, corporate social responsibility (CSR) and corporate sustainability are used widely in this thesis, and thus it is important to understand and define their meaning. Where this thesis focuses on sustainable investing from the investor point of view, it is still required to understand the broader concept of sustainability and sustainable development from the society's point of view as well as CSR or corporate sustainability from a company's point of view. These three concepts are interlinked and it is important to understand their role and origins in modern society.

First, terms *sustainability* and *sustainable development* are closely linked together and they are presented more thoroughly in the next chapter and thus they are not covered in more detail in this section. Overall, these two terms can be seen as a broader concept and hypernym for other terms.

Corporate social responsibility (CSR) is a term to describe actions of business enterprises. European Commission (2011) defines CSR as "the responsibility of enterprises for their impacts on society". Commission states that corporations should have processes to integrate social, environmental, ethical, human rights and consumer concerns into business operations and strategy. Moreover, this should be done in a close collaboration with company's stakeholders, while aiming to maximize shared value for company's shareholders, stakeholders and society at large, as well as, to minimize possible negative impacts of business activities. Moreover, as explained by European Commission, companies are encouraged to adopt longer-term strategic approach to CSR.

Corporate social responsibility (CSR) is widely established term both in practice and in the academics. However, beside the previously presented term also term *corporate sustainability* has gained popularity. As defined by Dyllick & Hockerts (2002), corporate sustainability refers to integrating economic, ecological and social aspects into business operations. Also this term requires companies to integrate short-term and long-term aspects of their businesses. In this thesis CSR and corporate sustainability are used as a synonyms and no distinction is made between these

two terms. However, it is important to note that terminology related to previously presented terms is abundant and versatile, and thus different practitioners can set different interpretations to them.

Finally, I will define the terms *sustainable investment* and *ESG* in the context of this thesis. Investment practices that consider non-financial information alongside with the traditional financial analysis have seen a strong growth during the past decade. *Environmental, social and governance (ESG)* factors have become increasingly important issues in the global world. Both institutional and retail investors have started to integrate and include ESG information into their investment practices and strategies. In general, along with profits and risks, investors consider ESG factors as important criteria in investment decisions as they present an important source of information helping to create a comprehensive picture of the underlying investment opportunity. This development has been driven by the growing evidence that including ESG factors into investment process contribute to achieving financial goals by creating a more completed picture of the underlying risk-return profile. (Robeco, 2019)

The Table 1 below briefly demonstrates different factors under each of the three ESG components – environment, social, and governance. However, it is important to keep in mind that this list is not exhaustive and different ESG factors are relevant for different companies. For example, for a mining company the material ESG factors will be different compared to a company operating in a financial industry or in a retail industry.

Table 1. Examples of ESG factors (Sustainability Accounting Standards Board (SASB), 2019)

Environmental	Social	Governance
Climate change risks	Gender diversity	Board structure/size
Energy efficiency	Health and safety	Corruption
Waste management	Human rights	Executive compensation
Carbon emissions	Employee relations	Ownership structure
Raw material sourcing	Community relations	Shareholder rights

There are plenty of names to describe investment actions, which consider also other than financial factors. The diverse terminology has been formed during the past decades, when the practitioners and academics have developed the field of sustainable investing further. All in all, despite of the scattered terminology, usually different terms are used to describe the same subject i.e. improving the risk-return profile of an investment by adding also non-financial information into analysis. However, due to diversity in terminology, different interpretations and misconceptions can still be common today. This raises the importance of creating a common language around the topic.

Especially, the term 'responsible investment' has gained popularity after the launch of the United Nations Principles for Responsible Investment in 2006. As PRI Association is considered the key initiative around sustainable investing, it has gained popularity. However, the most widely used term in the academics and used widely in public discussion is S*ocially responsible investing (SRI)* as explained by Eccles and Viviers (2011). The authors researched different terms used to describe integration of ESG factors into investment practices over the time period from 1970 to 2009 and covering 190 academic papers. Based on their study, more than 50 per cent of the academic literature in their sample use Socially responsible investing whereas Responsible Investment is mentioned only six times. However, the authors propose that term responsible investment should be formalized to be used to describe "investment practices that integrate a consideration of ESG issues with the primary purpose of delivering higher-risk-adjusted financial returns" for the reason that, based on their analysis term Socially responsible investment is linked to investors' ethical values and decisions and using the term might assume that investor is willing to scarify returns.

In this thesis, the focus is on how ESG factors can contribute to investment returns despite of investors' ethical motivations. Moreover, my aim is to link the discussion of sustainable investing into the broader topic of sustainability, sustainable development and corporate sustainability. For that reason in this thesis, I will use the term *Sustainable investment* to describe "an investment approach and strategy, where ESG factors are considered financially material for the investment outcome in terms of financial returns and risks, and investments are targeted into companies that consider sustainability in their operations". My decision to use term Sustainable investment, even though it is not well stabilized in the academics, is justified by the observation that it is widely used term by the financial industry (e.g. BlackRock, Morgan Stanley, J.P. Morgan, Nordea, Danske Bank).

Moreover, the term 'Sustainable finance' has emerged as a popular term as European Commission presented Sustainable Finance Action Plan in March, 2018 and provides a definition: "Sustainable finance is the provision of finance to investments taking into account environmental, social and governance considerations" (European Commission, 2018). After the launch of EU Sustainable Finance Action Plan, also the financial industry has introduced the term sustainable finance in their communications. Sustainable finance can be seen as a hypernym to describe all investment activities that finance transition to a more sustainable society, including fixed income. As the focus of my thesis is on the equity market, I consider the term Sustainable investing to be a more accurate.

At the time of writing this thesis, it is expected that Sustainable finance as a term will gain more and more popularity in the following years, and it will be interesting to see how the terms Sustainable investment and Sustainable finance develop next to each other in the coming years. For example, Nordea provides the following information on their webpage to describe what Sustainable finance means for the bank:

> "Sustainable Finance at Nordea is about integrating sustainability into all our business activities and products within our core areas investment, lending and customer advice. We are constantly facing global challenges and in relation to our business it means that we have to work integrated with environmental, social and governance issues in all our fields. -- By acting on behalf of our clients we can contribute to economic growth and prosperity, through capital allocation and interaction with companies. This is not only a business opportunity, but a part of our fiduciary responsibility".

2.2. Sustainability and sustainable development

In this section I provide a brief introduction to a concept of sustainability in general, how the concept has emerged and developed, and why it has become increasingly important issues in today's modern and global world, affecting the decision making of politicians, consumers, investors and other stakeholders. In general, the term sustainability has only emerged during the past 50 years as explained later in this chapter. However, the origins of the term 'sustainability' can be linked to a much older forestry term 'sustained yield', which indicates the amount of resources that can be harvested without sending the resource into a decline (Sustainable Development, 2019). In this thesis, the topic of sustainable investing is put in a larger context of sustainable development, and thus it is crucial to understand what sustainability and sustainable development means. By doing that, investors are able to link their own actions to common needs.

Since the early 20th century, after the industrial revolution, humankind has relied heavily on fossil fuels, especially coal and oil, as well as, on extracting natural resources to pursue economic growth. This development has certainly increased the wellbeing and wealth in our planet as discussed in the introduction, but on the other hand, during the last decades we have witnessed in accelerating pace the negative outcomes of this progression. The current lifestyle, especially in the Western world, is based on growing consumption, and to answer to the growing demand, more and more natural resources are exploited. At the same time our energy consumption is increasing leading to more demand for fossil fuels. Also the economic growth of China and India has increased the need of using natural resources. According to WWF (2018) humanity's ecological footprint has exceeded the world biocapacity for more than 40 years - currently 1.7 Earths would be required to meet the demands humanity currently makes on the nature. On the other words, humanity uses currently more natural resources than the planet can replenish, and eventually, on a long-term, the problem is running out of resources to support current production and consumption patterns.

The origins of the term sustainability, as it is known today, can be connected to the birth of environmental movement in the mid-20th century, when increasing societal attention were addressed to the consequences of environmental pollution of growing industrial production. Due to technological development and growing production, human actions were causing notable harm for the environment. At the time, broader awareness in environmental problems was caused by the

publication of a now famous, and back then seminal, book 'The Silent spring' by Rachel Carson in 1962 documenting the effects of pesticides on birds and other wildlife. On the aftermath of the birth of environmental movement, first modern environmental laws were created in the United States. In modern times, one of the first steps to recognize the problem related to the scarcity of natural resources, contamination and economic growth were made in 1972, when Rome Club presented its report *"The Limits to Growth".* This was also the first time the term 'sustainable' was used in its modern sense to describe a state where global population would achieve equilibrium while being capable of satisfying the basic material requirements. (Rethinking Prosperity, 2015)

On the same year of 1972, United Nations Conference on the Human Environment held in Stockholm, Sweden, gathered representatives from different nations to discuss on human interactions with the environment. As an outcome of the meeting, a declaration containing 26 principles concerning the environment and development was agreed (UNEP, 2019). Stockholm meeting can be seen as foundation for further global actions on sustainability.

However, the groundbreaking point was reached 15 years later due to inception of World Commission on Environment and Development (WCED), known also as Brundtland Commission, in 1983. The commission was tasked by the Secretary General of the UN to "re-examine critical environmental and development problems around the world and formulate realistic proposals to address them" (Corporate Knights, 2018). The Burndtland Commission published a report called "Our Common Future" in 1987 introducing a new concept – *'sustainable development'*. In the report, sustainable development is defined as following (Our Common Future, 1987):

> *"development which meets the needs of current generations without compromising the ability of future generations to meet their own needs".*

This concept of sustainable development has affected remarkably how we think today about economic, social and environmental development. The report brought term sustainability into international discussions. Brundtland Commission's key message was that development is acceptable but it must be sustainable in the long-term and not cause growing environmental problems, and also that development must meet the needs of the poor and thus decrease global

inequalities. On other words, sustainable development aims to increase economic and social well-being while protecting the natural resource base and the environment. In the long-term, economic development is not possible without social and environmental developments and considerations.

In academics, sustainability and economic development were brought together, for the first time, in the highly cited paper of Barbier (1987) called "The Concept of Sustainable Economic Development". In this paper, he stated that there is an increasing recognition that the overall goals of environmental conservation and economic development are not conflicting but can be mutually reinforcing. The paper presents a concept of "sustainable economic development", and argues that "real improvements cannot occur unless the strategies which are being formulated and implemented are ecologically sustainable over the long term".

After the publication of "Our Common Future", the next major milestone was the United Nations Conference on Environment and Development (UNCED). The conferences is better known as 'Earth Summit' and it was held in Rio de Janeiro in June 1992. The conference adopted an agenda called 'Agenda 21' – a non-binding action plan for the United Nations, other multilateral organizations and individual governments to advance sustainable development. (The United Nations, 2019)

The legacy of this meeting is significant as the conference also agreed on a legally binding agreement called United Nations Framework Convention on Climate Change (UNFCCC), which eventually led to the Kyoto Protocol in 1997 and to the Paris Agreement in 2015. Kyoto Protocol was the first global effort to set binding obligations for developed countries to reduce their greenhouse gas emissions. The Paris Agreement can be seen as a most ambitious global effort to tackle climate change as it aims to limit global warming to less than two degrees Celsius, and pursue efforts to limit the rise to 1.5 degree Celsius. The agreement is signed by 195 nations and 185 nations have become party to it. (The United Nations, 2016)

From the investor and company point of view, Paris Agreement can be seen as an important culmination point, as it has affected and shaped the global discussion around climate change and set a new ambition level for all different parties in the society to contribute to mitigating the negative effects of climate change. Institutional investors have been in the front row to urge governments to take more ambitious and significant actions to tackle climate change. A group of 415 institutional investors with $32 trillion AUM have signed a Global Investor Statement targeted

for governments to implement more actions to reach the goals of Paris Agreement. (The Investor Agenda, 2018)

Where most of the discussion before focuses on the commitments and efforts of the multilateral organizations and governments, also companies have made own commitments to sustainability. The world's largest corporate sustainability initiative is United Nations Global Compact, which encourages business worldwide to adopt sustainable and socially responsible policies, and to report on their implementation. The initiative was launched on July 2000, and currently almost 10 000 corporate participants from 159 countries have signed the initiative. UN Global Compact builds on the ten principles considering issues of e.g. human rights, labour standards, environment, and anti-corruption. These principles serve as a guideline for companies to guide their sustainability work and commitments. The principles focus both on the social and environmental questions. (UN Global Compact, 2019)

Despite of the growing recognition and efforts with sustainability, many of the social and environmental challenges are still current. Environmental problems were originally local but at the end of the 20th century, it was evident that environmental issues are able to cause challenges in a global scale. Where environmental problems are much at the global scale today, social problems are more visible at a local level and can be hidden from the public. For example, today there are more slaves in the world than ever before. It is estimated that 40 million people are enslaved worldwide - modern slavery is connected to corporate actions through complex supply chains (Global Slavery Index, 2018). Even though basically all of the largest corporations in the world has adopted the UN Global Compact principles, many of the sustainability challenges still remain unsolved. As there are only a little binding regulation for companies to consider sustainability in their actions, business has been able to continue to exploit the holes in the regulation.

To raise collective attention to the growing social and environmental problems and enhance global actions, United Nations General Assembly introduced Sustainable Development Goals (SDGs) in 2015. SDGs present 17 global goals with 169 targets and indicators. The goals cover both environmental and social topics ranging from renewable energy and biodiversity to ending poverty and achieving gender equality. Sustainable Development Goals build on their predecessor the Millennium Development Goals (MDGs) created by the United Nations in 2000. (The United Nations, 2015) The 17 goals are presented in the Figure 1.

Figure 1. United Nation, Sustainable Development Goals (SDGs) (The United Nations, 2015)

Since their launch, Sustainable Development Goals have fast gained their place as a guiding framework and strategic lens for different stakeholders to lead their actions and commitments toward more sustainable society. In 2018, three years after the SDGs were introduced, a consulting company PwC published a report studying the relationship between SDGs and business by analyzing corporate and sustainability reporting of 729 companies across 21 territories and 6 broad industry groups.

The report found that 72% of companies mention the SDGs in their annual corporate or sustainability report, 50% of the companies have identified priority SDGs, and 54% of those that prioritized the goals, mention the goals in their business strategy. One of the reasons behind growing interest for businesses to adopt the SDGs as a framework to guide their actions, is the estimate that achieving of the SDGs require annually approximately $5-7 trillion USD public and private investments (SDG Accelerator, 2019).

Private sector participation is critical, as underlying issues are complex and global at scale. A report by The Business and Sustainable Development Commission (2017) presents that “achieving the Global Goals will unlock USD $12 trillion in new market opportunities by 2030”. The following quote from Peter Bakker, the president and CEO of World Business Council for Sustainable Development, captures the idea that global challenges are a market of opportunity for companies in different industries, and SDGs provide them a lens to understand the changing society, future markets, and to ensure that they can earn their license to operate in the eyes of different stakeholders also in the future.

> "The SDGs represent an ambitious and transformative agenda. Businesses that take an active role in leading this transformation and position the SDGs as a strategic lens at the core of their operations will ultimately be better placed to unlock market opportunities, manage emerging risks, and consolidate an enduring license to operate on the road to 2030."
>
> - Peter Bakker, President and CEO, World Business Council for Sustainable Development (WBCSD)

2.3. **Global sustainability challenges**

Global sustainability challenges are complex and systemic by their nature. Rockström et al. (2018) demand for more holistic approach to understand the interdependent human-nature and people-planet reality of the 21st century. In the globalized and industrialized world, people and the Earth's biophysical systems have become increasingly connected and interdependent. The aggregate forces of human actions influence the Earth in a scale not witnessed before, and therefore, humanity is at high risk to cross Earth system thresholds leading do irreversible effects. Referring to the words of the authors: "we have transitioned from being a relatively 'small world on a big planet', to a relatively 'large world on a small planet'." (Rockström et al. 2018)

To provide evidence for increasing human presence and influence on the Earth, Steffen et al. (2015) have gathered data and present graphs describing socio-economic and Earth System trends from 1750 to 2010. Their work consists of 12 indicators for the human enterprise (e.g. population, real GDP, primary energy use, water use, transportation) and 12 indicators for different features of the Earth System (e.g. carbon dioxide, methane, ocean acidification, tropical forest loss. The graphs present a shift in the patterns of different indicators that the authors call 'the post-1950 acceleration" or "great acceleration" referring to acceleration in each of the indicators after the year 1950. The graphs were originally published in IGBP synthesis book in 2004 (covering the years 1750-2000), where it was stated that: "One feature stands out as remarkable. The second half of the twentieth century is unique in the entire history of human existence on Earth. Many human

activities reached take-off points sometime in the twentieth century and have accelerated sharply towards the end of the century. The last 50 years have without doubt seen the most rapid transformation of the human relationship with the natural world in the history of humankind." (Steffen et al. 2004).

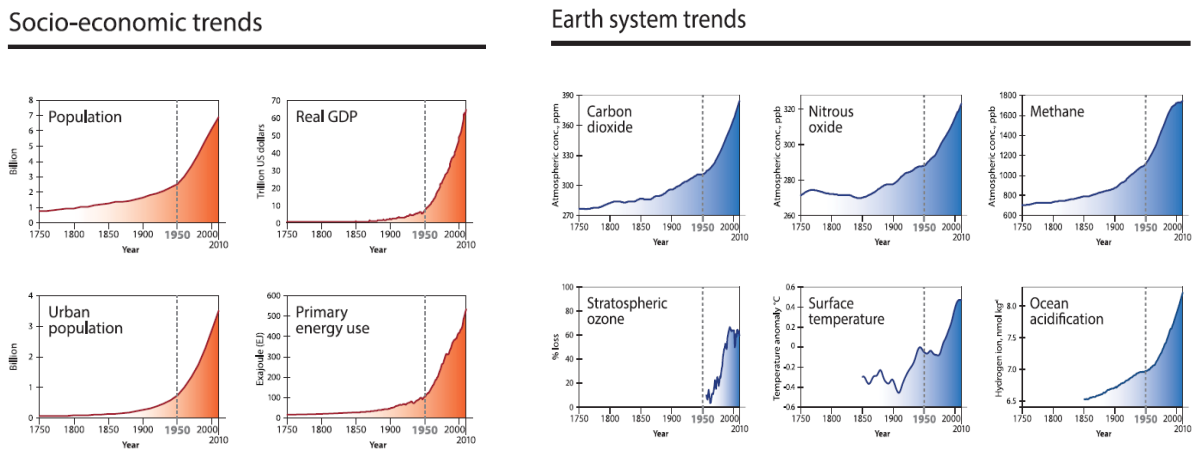

Figure 2. Examples of Socio-economic trends and Earth system trends (Steffen et al. 2015)

As described above, it is clear that today investors and companies across different industries are facing a changing and drastically different operating environment than they faced 50 years ago. Because of this change, investors and companies need to be able to understand and adjust themselves to the new operating environment.

Growing sustainability challenges in a form of population growth, growing environmental problems, water issues, climate change, over consumption and energy production have already shaped and will continue to reshape the world during the next decades. As different stakeholders expect companies and increasingly also investors to contribute to solving these global challenges, it is critical to understand the issues at hand. Moreover, companies need to be able to adjust their business models and strategies by considering how these challenges will affect their operations and, on the other hand, how their own operations will further affect these challenges.

In this section I briefly cover the main aspects of key sustainability challenges and also shortly discuss how these issues have already shaped the actions of different stakeholders. The following, highly interconnected, sustainability challenges will be covered in the following order:

1. Population growth and resource demand
2. Environmental problems
3. Consumption problem
4. Climate change
5. Global inequality

1. Population growth and resource demand

The global population has growth from 3 billion in 1960 to 7.5 billion in 2017. (The World Bank) The population is expected to grow to 9.2 billion by 2050 and 11.2 billion in 2100. The current growth rate of 1.10 % means that the world's population increases by 83 million people annually. The growth between 2017 - 2050 will mainly come from Africa and Asia. (The United Nations, 2017)

The growing population increases naturally the demand for natural resources, which are already scarce and overexploited. In addition, global food production is expected to increase due to population growth, which consequently increases the demand for water and for the croplands increasing the pressure for environment. FAO (2009), has estimated that feeding the population in 2050 would require raising global food production by 70% between 2005 and 2050. Moreover, global energy demand is growing significantly due to population growth and economic growth of especially large emerging countries (OECD, 2011). International Energy Agency has estimated that energy demand will grow by more than 25% between now and 2040. (IEA, 2018)

2. Environmental problems

World Economic Forum publishes annual Global Risk Report describing the most urgent risks threatening the society in terms of their likelihood and impact. In 2019 report, top five global risks by likelihood included three environmental risks and in terms of impact four out of five risks. The highest placed risk by likelihood was extreme weather events followed by failure of climate-change mitigation and adaption as well as natural disasters. (World Economic Forum, 2019)

Overall, as well highlighted by Steffen et al. (2015), the actions of human have reached a scale that the planet does not endure. According to recent studies, human actions have impacted significantly different environmental ecosystems. Major environmental problems cover etc. water scarcity, biodiversity loss, extinction of species and deforestation. WWF Living Planet Report (2018) shows, that populations of birds, fish, amphibians, mammals and reptiles fell by 58% from 1970 to 2012. According to the study, the current rate of global diversity loss is estimated to be a 1000 times higher than the (naturally occurring without human activity) background extinction rate.

Recent study by The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) found that nature is eroded at record rates in human history. IPBES report presents that 25% of animal and plant species are threatened, meaning that around 1 million species is in risk to face extinction within decades (IPBES, 2019). At the same time, an estimated 18 million acres of forests are destroyed each year, equivalent to 27 soccer fields every minute. This deforestation is largely driven by expanding agriculture, which is linked to a growing population as explained above. (WWF, 2019)

3. Consumption problem

A root cause for several sustainability related challenges is overconsumption, which directly increases the need for energy, water and raw materials. Along the consumption cycle, consumption creates emissions and eventually high amounts of waste. Global consumption is heavily tilted towards developed countries as people in rich countries consume approximately 10 times more natural resources than people in the poorest countries (The Friends of Earth Europe, 2009).

As stated by WWF's Living Planet report (2018), we are currently consuming 1.7 planet Earths each year indicating that our use of raw materials is higher than planet's capacity to produce natural resources. This rate is naturally higher in United States and in Europe compared to the rest of the world and the figures for US is 8 and for Europe 4. If rest of the world would consume at the same rate than average American household, an equivalent of 11 planet Earths will be needed to support global consumption.

As a global sustainability challenge, consumption problem is directly linked to increasing environmental problems as well as to climate change. Moreover, overconsumption is strongly

linked to modern human lifestyle. The topic of overconsumption has been discussed as a root cause of sustainability challenges for decades and a little has changed even though the environmental and social problems we face today are increasingly more present and acute. A highly cited paper of Goodland (1995) encapsulates the issue at hand clearly already over 20 years ago: "Much more education is needed for overconsumers to realize that rides in limousines are often slower as well as more polluting than those on the metro, and that eating three steaks a day reduces fitness."

4. Climate change

The understanding and evidence of human made climate change and global warming started to cumulate increasingly since the 1980s and scientific community has known the phenomena of climate change over a century (IPCC, 2007). However, the actions made during the past decades are almost minimum and the implications are increasingly becoming more evident. During the past 20 years we have witnessed all the time higher temperatures. Based on the data provided by NASA, eighteen of the nineteen warmest years have took place since 2001 (NASA, 2019). Figure 3 presents a graph of temperature anomaly showing clear accelerating trend.

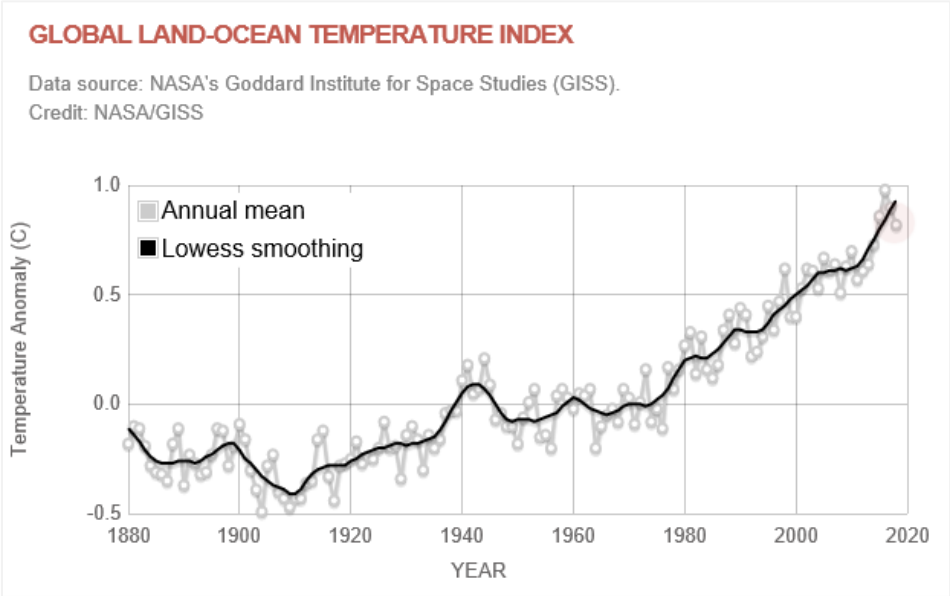

Figure 3. Global Land-Ocean Temperature Index (NASA/GISS, 2019)

The Stern Review (2006), a now famous report by economist Nicholas Stern, discuss the effect of global warming on the world economy. The report states that "climate change is the greatest and widest-ranging market failure ever seen, presenting a unique challenge for economics". Stern report states that early action of climate change outweighs the cost of not acting, and provides for example environmental taxes as a solution. In October 2018, Intergovernmental Panel on Climate Change (IPCC) published a special report called "Global Warming of 1.5 °C" on the aftermath of Paris Agreement. The report states that limiting global warming to 1.5°C requires "rapid, far-reaching and unprecedented changes in all aspects of society". The report informs that human activities have already caused approximately 1.0°C of global warming compared to pre-industrial levels. (IPCC, 2018)

5. Global inequality

Even though global economy has growth remarkably during the past decades, there exists still large inequalities between countries and within countries in terms of access to basic services. The Sustainable Development Goals introduced in 2015 aims to bridge the gap between the poorest and a decent living. According to The Sustainable Development Goals Report published in 2018, one billion people are living without electricity while, in 2015, 4.5 billion people lack access to proper sanitation and 2.1 billion people lack access to proper and safe drinking water supplies. On the other hand, many statistics show significant improvements in global inequality. For example, the rate of extreme poverty has fallen fast and estimate 11% of world's population, 783 million people, live below extreme poverty threshold in 2013. This number is only one third of the estimated value in 1990. (The United Nations, 2018)

As other sustainability challenges, also inequality is closely linked to climate change. While developed countries are most responsible for climate change, the local negative impacts will occur in poorer countries. At the same time wealthy countries are also those that have benefited from the actions causing global warming. (King & Harrington, 2018) Moreover, Diffenbaugh & Burke (2019) found that global warming has increased global inequality between the richest and poorest countries by 25%.

2.4. Responsible investment and its historical origins

As explained by William et al. (2011), modern finance theory, as we know it today, started to form in the 1950s and peaked in the 1970s. It is built on key components such as the efficient market hypothesis (EMH), capital asset pricing model (CAPM) and Markowitz's portfolio theory, to name a few of the most important building blocks. At the core of modern finance, are the critical assumptions of market efficiency and rational behavior. Based on these assumptions, information is available equally to all market participants, all agents are rational, and everyone makes decisions according to expected values of risks and returns. Modern finance builds on ideal and perfect markets, creating a gap to real world with imperfect markets and irrational behavior. Moreover, in a real world, markets are not free from moral and ethical issues. As financial markets operate within the society, the key question is how financial markets serve the society and, on the other hand, how the society affects financial markets.

In the real world, markets are not perfect and there exist information asymmetries between different parties. Krosinsky et al. (2012) state that today's financial markets are deeply flawed and they fail to reflect long-term social, economic and environmental value in asset prices. Due to this flaw, investors can "achieve a significant information advantage by analyzing these values and integrating them both into asset class decisions, as well as through the exercising of ownership rights – in effect anticipating underlying changes in the economy long before the mainstream." According to modern finance theory "price is always right", but however, in the reality material environmental, social and governance factors do not necessarily correctly reflect in the asset prices. A current example is climate change; potential physical impacts of climate change, developing climate policy, and the disruption caused by new technologies, can significantly affect asset prices on different industries. A study by the The Economist Intelligence Unit (2015) has estimated that the value at risk (VaR) to the total global stock of manageable assets because of climate change yields to on average $4.2 trillion between now and the end of the century. In different scenarios, the value losses can raise as high as $43 trillion, presenting one third of global stock of manageable assets.

To tackle growing sustainability challenges, including climate change among many, using assets as an instrument has become a widespread topic of discussion both in the financial sector and in

politics. Demand for sustainable financial products is increasing and asset managers are integrating ESG factors into their investment processes. In addition, lately, active ownership to pursue sustainability issues has become increasingly an important tool of responsible investing strategies applied by investors. The development of responsible investing has developed together with other popular topic, namely Corporate Social Responsibility (CSR) referring to actions by a corporation to improve its sustainability performance. As corporations are the object of responsible investing, it is natural that these two have developed hand in hand.

Responsible investing has had historically a strong connection to ethical investing. In his article, Schueth (2003) provides a brief history of the origins of responsible investment. The origins of responsible investing can be traced back to hundreds of years. The background of today's responsible investment has been founded already in biblical times with a strong link to religions and ethics.

Jewish law set first specific rules on investments in ethical manner. In addition, Islam had own mandates regarding investing ethically. Next wave of responsible investing occurred in the mid-1700s as Methodist Church and Quaker movement applied negative screens to certain types of investments, e.g. slavery and weapons. In 1960s and 1970s, US civil rights movement, the Vietnam war, as well as apartheid in South Africa increased political and public awareness of social responsibility. In the 1980s and 1990s, the interest was turned towards environmental issues as events such as Exxon Valdez and increased attention to global warming affected investors and other public. (Schueth, 2003)

2.5.Investment strategies

Global Sustainable Investment Alliance (GSIA) is a global sustainable investment organization combining regional organizations. GSIA definitions for sustainable investment have become a global standard for classification. GSIA (2018) defines seven sustainable investment strategies, which are. Different strategies are presented in the Table 2 below based on the definitions provided by GSIA.

Table 2. Classification of Sustainable investment strategies (GSIA, 2018)

Strategy	Definition
1. Negative screening	The exclusion from a fund or portfolio of certain sectors, companies or practices based on specific ESG criteria
2. Best-in-class / Positive screening	Investment in sectors, companies or projects selected for positive ESG performance relative to industry peers
3. Norms-based screening	Screening of investments against minimum standards of business practice based on international norms, such as those issued by the OECD, ILO, UN and UNICEF
4. ESG integration	The systematic and explicit inclusion by investment managers of environmental, social and governance factors into financial analysis;
5. Sustainability themed investing	Investment in themes or assets specifically related to sustainability (for example clean energy, green technology or sustainable agriculture)
6. Impact investing	Targeted investments aimed at solving social or environmental problems, and including community investing, where capital is specifically directed to traditionally underserved individuals or communities, as well as financing that is provided to businesses with a clear social or environmental purpose
7. Corporate engagement and shareholder action	The use of shareholder power to influence corporate behavior, including through direct corporate engagement (i.e., communicating with senior management and/or boards of companies), filing or co-filing shareholder proposals, and proxy voting that is guided by comprehensive ESG guidelines

The size of the responsible investment market and different strategies are presented in the following chapter 2.6. Overall, to describe the development of responsible investing strategies, the initial focus was heavily on negative screening and risk-based assessments. The next phase was ESG integration, referring to asset managers actions to integrate non-financial analysis as a core part of the investment process. Today, ESG integration has become mainstream and is integral part of the investment process. Most recently, the rise of thematic investing and impact investing have focused more heavily on the opportunities provided by sustainable companies providing positive social impacts. (GSIA, 2018)

During the recent years negative screening and exclusion strategies have played important role in relation to certain industries. Fossil fuel divestment movement is one of the fastest growing divestment movements ever. Fossil fuel divestment aims to remove investments from companies that extract fossil fuels and instead, to invest in renewable energy and other climate solutions. This trend is strongly driven by climate change and on the aftermath of the Paris Climate agreement, a large number of investors have removed partly or completely fossil fuel companies from their portfolio. Originally, the movement started in 2010 from the university campuses in the United States and spreading and creating a global movement. By December 2018, over 1000 institutions worth almost $8 trillion have committed to divest from the world's biggest oil, coal and gas companies. (Go Fossil Free, 2018)

2.6. Responsible investment today

Responsible investment has grown notably during the last decade. The 2018 report of Global Sustainable Investment Alliance (GSIA) summarizes the status of responsible investing. The report states that the global AUM of responsible investment strategies was $30.7 trillion in 2018. The increase compared to AUM in 2016 is 34 percent. In all other regions except Europe witnessed a market share growth of sustainable investing. Geographically, on absolute terms, Europe and the United states manage the highest portion of assets, 46% and 39% of the total sustainable investing assets globally, respectively.

Negative screening presents the largest responsible investment strategy with $19.8 trillion AUM. Followed by negative screening is ESG integration with $17.5 trillion AUM and a significant growth rate of 69% compared to the amounts in 2016. The fastest growing strategies between 2016 and 2018 were impact investing (79 percent) and sustainability themed investing (269 percent), however, in absolute dollar terms these two strategies are still the smallest.

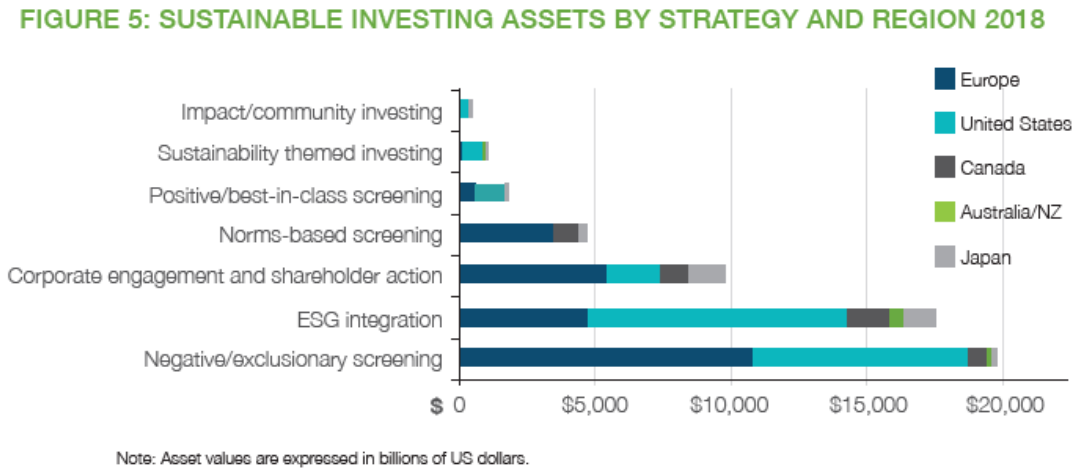

Figure 4. Sustainable investing assets by strategy and region 2018. (GSIA, 2018)

One of the main reasons behind growth of responsible investment is the growing adoption of ESG practices by institutional investors. In 2006, United Nations Principles of Responsible Investment (PRI) were introduced, together with United Nations and a group of institutional investors, aiming to developing a stable and more sustainable global financial system supporting long-term value creation.

As of April 2019, close to 2500 institutional investors having signed the initiative, it is the world's leading proponent of responsible investment. The goals of the initiative are "to understand the investment implications of environmental, social and governance issues and to support signatories in integrating these issues into investment and ownership decisions". In 2019, institutional investors who have signed PRI represents US$80 trillion of assets comprising approximately half

of the world's institutional assets. These investors commit to consider environmental, social and governance (ESG) factors in their investment decisions.

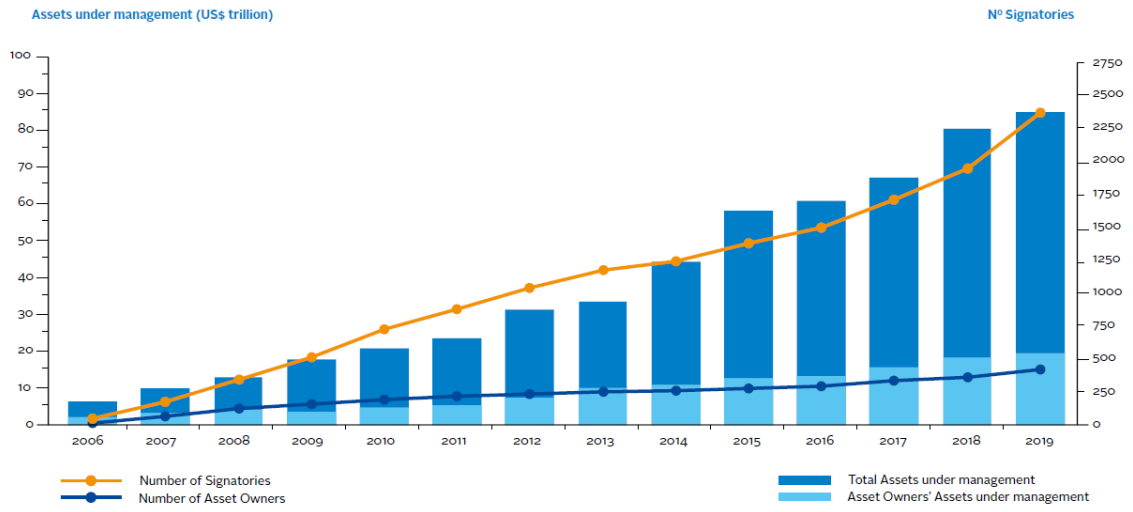

Figure 5. The growth of PRI signatories from 2006 to 2019 (UN PRI, 2019)

Six principles of UN PRI are:

1. We will incorporate ESG issues into investment analysis and decision-making processes.

2. We will be active owners and incorporate ESG issues into our ownership policies and practices.

3. We will seek appropriate disclosure on ESG issues by the entities in which we invest.

4. We will promote acceptance and implementation of the principles within the investment industry.

5. We will work together to enhance our effectiveness in implementing the principles.

6. We will each report on our activities and progress towards implementing the principles.

Recently there have been several important milestones and developments that further will advance the growing importance of sustainable investing. It is expected that more and more institutional investors will integrate sustainability as an integral part of their portfolios and portfolio

management. Moreover, the legislation is becoming more sophisticated in that sense and providing clearer boundaries for all parties to ably suitable approach for them.

In March 2018, European Commission released its strategy for a financial system that supports the EU's climate and sustainable development agenda. In the form a sustainable finance Action Plan, EU Commission presents several improvements, which will affect the financial industry. As of May 2019, there are several ongoing legislative processes, which aim to integrate ESG factors into broad aspects of financial markets. The EU Sustainable Finance Action Plan has three goals, which are: (1) reorienting capital flows towards sustainable investment, (2) mainstreaming sustainability into risk management, and (3) fostering transparency and long-termism. (European Commission, 2018)

Other main initiative is the Task Force on Climate-related Financial Disclosures (TCFD). TCFD is a global task force set up by the G20 and its objective is to develop a voluntary framework for companies to disclose the financial impact of climate-related risks and opportunities. The initial draft recommendations of the task force were released in December 2016. The recommendations include four thematic areas (governance, strategy, risk management, metrics and targets). Companies should disclose their governance around climate-related risks and opportunities; their actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning where such information is material; how the organization identifies, assess and manages climate-related risks; and the metrics and targets used to assess and manage relevant climate-related risks and opportunities, where such information is material. (TCFD, 2017)

2.7. Shifting focus from short-termism to long-termism

To close the chapter 2, which has addressed the questions related to sustainability and capital markets, and their ever growing connection, I will discuss one of the vital questions regarding improving the sustainability of the whole economic system and the role of capital markets within it. This questions relates to short-termism and long-termism, and is also one of the goals of Commission's Action plan.

The global sustainability challenges represents forces that will drastically affect how and by whom value is created in the future. Aiming to solve these challenges and pursuing sustainable development will require forward-looking thinking and long-term orientation in the decision making of different parties including governments, regulators, consumers, investors and individual companies.

As defined by Brundtland Committee, sustainable development refers to "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs". When examining the definition of sustainability from a company perspective, Bansal et al. (2014) state that sustainability in a business context refers to "the ability of firms to respond to their short-term financial needs without compromising their (or others') ability to meet their future needs". It is easy to argue that development of current generations needs the contribution of businesses as a source of products and services, and most importantly, as a source of innovation. When accepting that development requires the actions of companies, it can be defined that on the long-term, the goal should be that both business and society can succeed next to each other for generations. The key question of a 21st century is how this balance can be achieved?

As UN Secretary Ban Ki-Moon has stated, "business can be a global force for good" (United Nations, 2015). However, the 20th century and the early 21st century has showed us that focusing on short-term outcomes can lead to undesirable and, in some cases, unintentional future impacts. On the other hand, it is good to note that many of the challenges humanity is facing today, are systemic issues by nature. Thus there is also a need for a systemic change. Bansal et al. (2014) explain that "firms are systems nested within larger macro-systems". Authors explain that these macro-systems constitute of economic, societal, and ecological systems and to maintain a balance at a macro-level, different natural (and other) resources "must be distributed at micro-level across time". On the other words, applying too short time frame for actions at micro-level, will eventually ride macro-level systems out of a balance.

Short-termism can be seen as an opposite to sustainability. As argued by Bansal et al. (2014), "sustainability requires the consideration of time". The authors explain that sustainability forces companies to make intertemporal trade-offs, and that the omission of time from the strategic management has contributed to the raise of short-termism. They state that: "sustainable businesses

are those that manage intertemporal trade-offs in strategic decision making, so that both the short and long term are considered". Also Eccles et al. (2014) see that for a company, long-term time horizon is an important element of adopting and integrating ESG factors into business. Furthermore, integrating sustainability considerations into business requires effective stakeholder engagement. This sets a requirements for companies to adopt a longer-term time horizon as on a short-term companies will always face trade-offs in meeting variety of needs from different stakeholders. According to the authors, companies need also foster long-term thinking towards different stakeholders, as also stakeholders might have tendency to focus too much on short-term outcomes.

However, during the past decades, the reality has been different. Graham et al. (2005) surveyed 401 financial executives and found that 78% of the surveyed executives were willing to sacrifice long-term value creation in order to smooth earnings to meet short-term earnings targets. Moreover, the same study shows that a project with a positive NPV is evaded if this leads to falling short of current quarter's earning consensus. The authors explain, that the tendency to avoid missing earnings targets as this would increase the uncertainty around the stock price and reduce the predictability of earnings by investors and analysts.

One of the implications of this kind of short-term orientation is environmental and social externalities. So far companies have avoided costs by externalizing cost to the society. Fatemi & Fooladi (2013), argue that shareholder centric approach to wealth maximization has favored the externalization of many costs and created unacceptable outcomes, which are opposite to the idea of sustainability. They argue that a more sophisticated model, which accounts for the social and environmental costs of a project, is needed. Moreover, they state that those companies who are early adopters in incorporating the social and environmental costs into their business model and decision making will face a positive demand shift. On the other hand, non-adopters are going to face a negative demand shift as environmental and social concerns become more broadly recognized.

Traditionally addressing externalities have been seen as a task of governments and regulators, but to the date they have largely failed on doing this. One solution is corporations' voluntary actions to address sustainability and negative externalities on their own actions (see e.g. Halme & Laurila, 2009). On the other hand, some authors have argued that if companies voluntarily try to solve

externality issues, they will be eliminated by competitors who do not act in the same way or will survive only by using their profits to this matter. (Jensen, 2002)

However, as the challenges we face are getting more and more visible and severe, the stakeholder expectations towards companies are changing and more demand is put for corporate sustainability related actions. It might well be the case, that in the past companies have been in a position where addressing externalities has been doomed to result in business discontinuity. Today, it has become more evident that businesses and investors can be part of the solution to confront the global challenges. Based on the UN Global Compact-Accenture CEO Study in 2014, 88% of investors, and 79% of CEOs, see sustainability as a route to competitive advantage (Accenture, 2014). Two years later in 2016, Accenture CEO Study tells that 97% of CEOs believe that sustainability is important to the future success of their business (Accenture, 2016) Moreover, 87 % of CEOs believe the SDGs provide an opportunity to rethink approaches to sustainable value creation (Accenture, 2018).

When building a more sustainable economic system, a transformation from short-term returns to long-term prosperity is needed. New business models are emerging and new products and services are developed to answer to ongoing challenges. Several major global companies have positioned themselves as a sustainability leaders while aiming to create value for both shareholders and other stakeholders.

On the other hand, short-termism from a company perspective can lead to several problems. Short-term behavior can lead the company to neglect necessary R&D costs (which could be profitably for the company in a long term as well as potentially beneficial for the society in term of for example more environmental efficient technology). Other example of company short-termism is employee health and wellbeing. In the short run it can be company's incentive to cut costs of employee training. However, this behavior may lead to hazards and fines, to bad reputation among public, potential customers and employees, as well as, it might affect the decision making of investors and attract the attention of regulator. Finally, other example of short term orientation are employee layoffs and relocating business operations to lower-cost countries. In the short term, these actions can make the balance sheets and profit loss statements look more attractive for investors, but at the same time they might decrease the innovation, employee motivation and hinder the competitive advantage of the company. (See e.g. Brauer, 2013)

3. LITERATURE REVIEW

3.1. Overview of the corporate sustainability literature

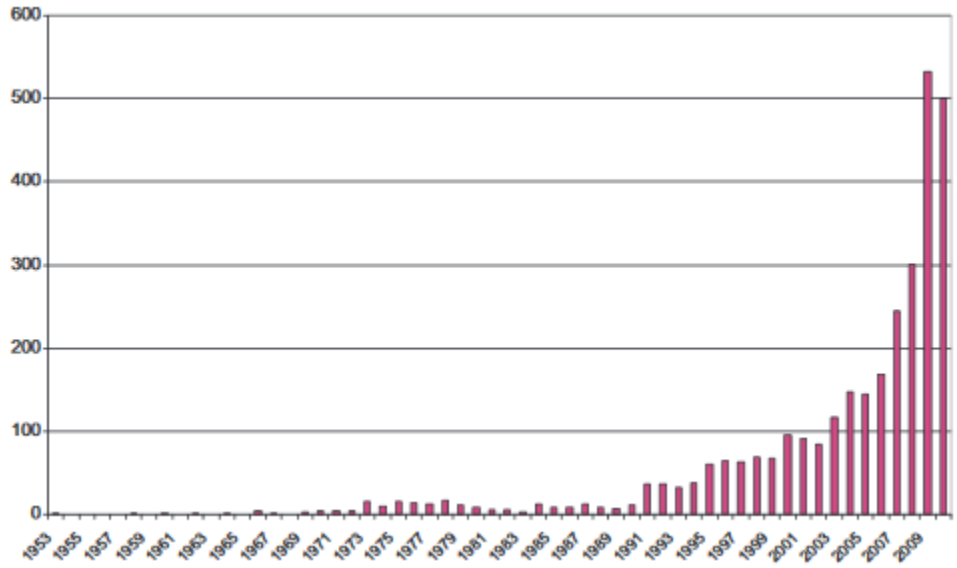

Figure 6. Number of publications on corporate sustainability per year 1953-2010, (Linnenluecke & Griffiths, 2013)

As corporations are objectives of responsible investing, it is necessary to understand the narrative and theoretical background of interlink between sustainability and companies. In their paper, Linnenluecke & Griffiths (2013) uses term 'corporate sustainability' to refer to firm responses to a wide range of social and environmental issues in additional to their economic activities. They use this term to describe research covering other widely used terms such as Corporate Social Responsibility (CSR) and Corporate Social Performance (CSP). Their paper presents bibliometric analysis based on citation data, containing 3117 published records between 1953 and 2011 (Figure 7.). The first records were published in 1950s and since the early 1990s the academic research has seen fast growth.

Based on their review, Linnenluecke & Griffiths (2013) identifies four main categories for the academic research covering corporate sustainability topics. Book by Bowen (1953) called "Social Responsibilities of the Businessman" was one of the initial contributions to raise the question of

the relationship between business and society. The book was considered as an important contribution to shape the emerging academic research and the discussion about social responsibilities of businesses.

According to Linnenluecke & Griffiths (2013), the four categories emerged are 1) Corporate social performance theory, 2) Stakeholder theory, 3) Corporate social performance vs. financial performance, and 4) Greening debate. The first stream focuses on the view that as firms are part of society, they have obligation to consider also other than purely economic factors. One of the key and early authors within this stream was Carroll (1979) introducing the concept of corporate social performance. This research stream have contributed to the literature by developing theoretical framework and definitions to describe businesses link to societal issues. This stream also led to the birth of the concept Corporate Social Responsibility (CSR).

The second stream, Stakeholder theory, emerged in 1980s and presents the idea that firms "should respond to pressures and demands from their stakeholders in order to attain their overall strategic objectives" (Linnenluecke & Griffiths, 2013). In this thesis, stakeholder theory is presented further in the chapter 3.3. Role of the corporation in society.

The third steam, corporate social performance versus financial performance, is one of the major stream of research and examines empirically the link between CSP and economic/financial performance. This stream saw its daylight in the 1970s and has continued to these dates. In this thesis, chapter 4.1 ESG value relevance deal with this question.

Finally, the fourth stream, Greening of management debate, broke out in the 1990s, focuses on the view that firms should address ecological problems, and manage the negative environmental impacts of their activities. One of the important preceding milestones of this stream was the publication of 'Our Common Future' report released by World Commission on Environment and Development (WCED) in October 1987 defining the term "Sustainable development" as explained earlier in the chapter 2. Previously the focus of the academic research had been in the link between firms and society excluding the natural environment. This fourth research stream turned the focus additionally towards the environmental questions. (Linnenluecke & Griffiths, 2013)

3.2. Sustainable company as on objective of sustainable investing

To understand the discussion related to sustainable investing, it is mandatory to understand what makes a company sustainable. The concept of sustainability have evolved over time, as have also the stakeholder demands for corporate sustainability and sophistication of different stakeholders. Today, companies are expected even greater responsibility of their own actions. The key point is that companies should be able to assess both the negative and positive impacts of their business to the society and manage these impacts (see e.g. GRI). Sustainability has been traditionally seen as a risk factor but it has become more and more an opportunity for companies as well. In this chapter, I will briefly describe sustainability from the company's point of view and how this topic has evolved in the past decades.

Companies sustainability maturity differs based on the industry, geography, size etc. Halme & Laurila (2009) presents different types of corporate responsibility in their article to provide understanding of different "stages" of sustainability. They argue that corporate responsibility can be implemented in different ways (influencing its outcomes) and define three types of CR, which are 1) Philanthropy, 2) CR Integration, and 3) CR Innovation.

Comparison of CR action types

Dimension of action	CR action type		
	Philanthropy	CR Integration	CR Innovation
Relationship to core business	Outside of firm's core business	Close to existing core business	Enlarging core business or developing new business
Target of responsibility	Extra activities	Environmental and social performance of existing business operations	New product or service development
Expected benefit	Image improvement and other reputation impacts	Improvements of environmental and social aspects of core business	Alleviation of social or environmental problem
Example	Microsoft's software donations for charity groups. Merck employees build timber houses for poverty-stricken people[a]	Certifying facilities with e.g. ISO14001 or SA8000[b]	CEMEX's new business model: Housing for the poor with savings and micro-credit scheme

Figure 7. Comparison of CR action types (Halme & Laurila, 2009)

Figure 8 provides an overview of the three types. *Philanthropy* can be seen as the first state of sustainability maturity of a company. Sustainability is something that is not linked to company's core business but treated like a disconnect part (usually run by a marketing/communication division and can be easily seen as a type of 'green washing' without a clear link to business). Philanthropy has been common in the US and is still today. As company's CR actions do not have a clear link to company's business, they are not expected to generate any value or business benefits either. Rather, they are seen as a way to improve company image and brand reputation.

The second type, *CR Integration*, is defined by the objective of trying to combine CR with company's core business operations. The focus is on integrating different environmental and social issues (e.g. waste management, improved energy efficiency, employee health and safety, supply chain sustainability) into daily operations in order to improve company's sustainability performance in material issues. With these actions, companies are expecting for example benefits relating to corporate reputation, cost savings, risk reduction, or anticipation of legislation.

Finally, the third type, *CR Innovation*, refers to companies' actions related to using sustainability as a source of innovation in order to create new market opportunities and increase the revenue. As discussed in the chapter 2.3. Global sustainability challenges, the humanity is facing several challenges, which are strongly changing the business environment of companies as well as affecting a wide group of stakeholders and public. Companies can target these challenges and try to find innovative solutions to addressing these problems. In this way, global challenges can be seen as a market for opportunities for companies in different industries. By developing products and services to address these challenges, companies are able to have a strong business case and increased revenues while also aiming to create a win-win solution for different stakeholders. In this third and the most advanced type, CR is closely linked to company's business model and is a central part of company's long-term vitality and success. (Halme & Laurila, 2009)

When considering these three types, one can clearly observe the difference between the nature of different CR action types as well as the potential outcomes of these actions. If CR is seen more as a Philanthropy type, it probably is more of a cost for a company than a beneficial source of value creation. This type of CR can be linked to the views of Milton Friedman discussed in the next chapter 3.3. Role of the corporation in the society. On the other hand, if we discern CR as a source of innovation and new business opportunities (CR Innovation type), we are able to form a link

between the views of Jensen (2002) as well as Porter & Kramer (2011) and CR innovation type of actions. The views of Jensen and Porter & Kramer will also be presented in the next chapter.

In addition, CR Integration can be seen as an important way for companies to prevent value destruction (for example by diminishing the probability of environmental hazards or customer boycotts etc.). Finally, it is important to highlight that different types of CR presented in this chapter are not exclusive but complementary and companies are able to utilize these simultaneously. Through CR Integration companies are able to minimize the negative impacts and harm caused by its operations, while at the same time, through CR Innovation company can identify, exploit and create positive societal impacts and business value through its core business activities.

3.3. Role of the corporation in the society: Shareholder view vs. stakeholder view

> The economic power in the hands of the few persons who control a giant corporation is a tremendous force which can harm or benefit a multitude of individuals, affect whole districts, shift prosperity to another. The organizations which they control have passed far beyond the realm of private enterprise— they have become more nearly social institutions.
>
> - Berle & Means (1932): The Modern Corporation and Private Property

To understand the modern discussion about sustainable finance, it is a requisite to understand the earlier academic discussion of the role of companies in society and its link to the discussion about Corporate social responsibility (CSR). Serafeim (2014) argues that not all corporations have the same role in society and thus traditional profit maximization theories are not able to answer the questions concerning role of companies in society. Moreover, Serafeim states that "The role of corporation in society can be a function of the broader economic, social, and political context and as a result evolves over time". He sees that company and management actions to pursue

environmental and social goals has redefined the traditional role of companies within a broader society.

This discussion around companies' role in society is not a new one. The debate of corporations' social responsibility and the role of the corporation in the society dates back to 1930s as the opening quote of this chapter presents. In the early 1930s, E. Merrick Dodd and Adolf A. Berle, two American lawyers, entered into a public debate of the question to whom are corporations accountable. Dodd's view was that the corporation and its management is accountable for their actions only to shareholders. The second view presented by Berle, stated that corporations are accountable both to the society and to company's shareholders. This debate is called "The great debate" and it has formed the basis for still continuing discussion of the role of corporations in society. This debate also laid the ground for two competing theories: shareholder wealth maximization theory and stakeholder theory. (Renneboog et. al 2016).

Renneboog et al. (2016) provides a summary of these two contradicting theories in their article named "Socially Responsible Firm". In the article, the authors state that "Reality could lie somewhere between the good governance view and agency view of CSR. Some CSR-related corporate policies can be the result of good governance consistent with shareholder value, while others can be driven by agency problems." The good governance view sees that CSR can be in line with shareholder wealth maximization while also generating broader societal goals. The agency view, on the other hand, states that CSR is a cost for shareholders and not in their best interest. (Renneboog et al. 2016).

Companies and investors have traditionally focused on maximizing purely the shareholder value. From this point of view, any activities that contradict this goal are unfavorable for the company and its shareholders. Milton Friedman is one of the most renowned advocate of this view. Friedman argues in his 1970 New York Times Magazine article "The Social Responsibility of Business Is to Increase Its Profits" that managers have a moral responsibility to act always in the long-run best interest of the shareholders, and that businesses' sole purpose is to generate profit for shareholders. (Friedman, 1970) At that time, Milton Friedman's article was oriented to challenge the raising view that corporations have a responsibility to increase social welfare.

Friedman's view states that CSR is a signal of a classical agency problem within the firm. Based on the agency theory, CSR is a cost for the company and a misuse of corporate resources instead

of using resources to value-adding projects or returned to shareholders. (McWilliams et al. 2006). In addition, according to the agency theory, managers may use CSR as a personal reward and a tool to gain personal benefits at the expense of shareholders (Renneboog et al. 2008). To conclude, based on the Milton Friedman's shareholder wealth maximization theory and agency view, CSR is not beneficial for the shareholders.

In the 1980s, the raise of 'Stakeholder theory' challenged the previously dominant 'Shareholder view'. This challenging view is attributed to Richard Edward Freeman who wrote an article 'Strategic Management: A Stakeholder Approach' in 1984. Traditional definition for stakeholder is "any group or individual who can affect or is affected by the achievement of the organization's objectives. Stakeholders include e.g. customers, employees, local communities, suppliers and partners, shareholders. The stakeholder approach has become increasingly popular in the past decades. To conclude, this view sees that company's responsibility is deliver value to a broader group of stakeholders than just shareholders. (Freeman et al. 2011)

The academic discussion around shareholder wealth maximization and stakeholder theory have continued during the past decades. The two views presented are contradictory and pose problems. First of all, value maximization sees that company has only one objective, to maximize profits. The problem is that this view does not account the externalities of business activities that can be harmful for other stakeholders and broader society (e.g. emissions). As these externalities cause serious problems and challenges for society, it is not viable approach to business and investing in the long-term. One could argue, that this kind of behavior is like sawing your own branch. On the other hand, stakeholder theory sees that company needs to benefit several stakeholders but does not state how the tradeoffs should be made and to what extent. As there are several stakeholders with different and sometimes conflicting needs, companies are not able to fulfill all these needs simultaneously. (Smith, 2003)

Michael Jensen presents one solution to the contradiction between these two views. Jensen (2002) presents an alternative to clarify the relation between value maximization and stakeholder theory, and explains how firm can have a broader approach to value maximization for a broader group of stakeholders. He calls this view 'enlightened value maximization'. This view sees long-term value maximization as a goal for the company but addresses also the requisite tradeoffs among company's stakeholder. Jensen argues that when company focus on its long-term performance, the

conflict between shareholders and other stakeholders is resolved. He states that "Indeed, it is obvious that we cannot maximize the long-term market value of an organization if we ignore or mistreat any important constituency. We cannot create value without good relations with customers, employees, financial backers, suppliers, regulators, communities, and so on". Moreover, he sees that the key point of 'enlightened value maximization' is that the company uses society's limited resources wisely while returning greater value to society (i.e. firm maximizes total value creation for all stakeholders of the firm). By focusing on the long-term performance and considering different needs of stakeholders and company's impact (both positive and negative) to these stakeholders, company can future-proof its business and make the business model viable.

Also other scholars have presented their views on how business can interact with the society in a way that "expands the pie" i.e. creates value for both the business and other constituents. Porter & Kramer (2011) presents a concept of "shared value" in their highly cited Harvard Business Review article "How to reinvent capitalism – and unleash a wave of innovation and growth". They argue that business is seen as a major cause of environmental and social problems as well as benefiting at the expense of the society. In addition, they state that companies are seeing value creation too narrowly and optimizing short-term financial performance. At the same time, these companies do not observe the changing operating environment sufficiently, do not notice most important customer needs and ignore the broader influences that are important for long-term success of their business. According to Porter & Kramer, the principle of shared value refers to "creating economic value in a way that also creates value for society by addressing its needs and challenges", and it should be a central part of what company is doing. To summarize, the concept of shared value focuses on connecting societal and economic progress while expanding the total economic and social value created. The authors see this will be an important driver of innovation and productivity in the global economy.

3.4. Investor perspective: ESG and valuation

As defined earlier in this thesis, sustainable investing aims to enhance portfolio's risk-adjusted returns. To reach that investment objective in a sophisticated manner, it is relevant to understand in which ways integrating ESG factors can affect companies' returns and risks affecting to the

valuation. During the past decades, the question whether ESG leads to value creation has been in a high agenda of academic discussion. To continue the previous question, the interest has also been on the different mechanism and channels in which way the ESG may potentially affect company value. According to Malik (2015), academic CSR research has provided evidence on the value-enhancing capabilities of different ESG activities. However, the author continues by highlighting that the research is inconsistent regarding theoretical frameworks and arguments, and the understanding of the mechanics behand value-enhancing capabilities is still lacking. In this chapter, I describe academic discussion on this topic as well as the potential benefits of ESG activities.

Jones (1995), in line with stakeholder theory introduced by Freeman in 1984, argues that corporate social performance (CSP) can lead to a competitive advantage if the firm is able to develop relationships (contracts) with its stakeholders based on mutual trust and cooperation instead of opportunism. In addition, Malik (2014) states that "CSR may also be employed as an important strategic tool to maximize shareholder value as well as firm value by protecting other stakeholders' interests. These views represent ESG as a value creating approach. The opposite view, states that companies who are taking ESG actions are misallocation firm's resources and facing additional costs leading to competitive disadvantage, diminished firm performance and are consequently destroying shareholder value (Friedman, 1970). As ESG actions can pose both costs and benefits for companies, the interesting question is the net effect of these two alternatives. For example, McWilliams & Siegel (2000) have shown that the associated costs of ESG actions are relatively small when compared to potential benefits.

In general, as Malik (2014) presents, companies can increase the value of a firm by increasing sales and profits, improving operating performance, and reducing risks. First, companies can reach increased sales by introducing new products or services to the market, attracting customers with unique value proposition or based on loyalty, good brand image or other characteristics creating competitive advantage. Second, improvements in operating performance can lead to substantial cost savings through increased efficiency and productivity. In addition, costs related to employees, suppliers, and regulation can affect profitability. Third, the firm value is affected by idiosyncratic i.e. company-specific risks. Those companies who manage better their business and operational risks can increase value as they have a lower cost of capital.

In line with the previous, there are several potential sources of how ESG can create value. Malik (2014) identifies several benefits of ESG actions that contribute to increased firm value. These benefits can be classified to five groups: 1) product market benefits, 2) capital market benefits, 3) employee benefits, 4) regulatory benefits, and 5) operational benefits. These benefits contribute to company's ability to increase sales, improve operating performance, and reduce risks and ultimately affecting company's valuation. Figure 9 summarizes the potential sources of ESG value enhancing capabilities. (Malik, 2014). The empirical evidence related to selected benefits presented above are presented in the Chapter 4.

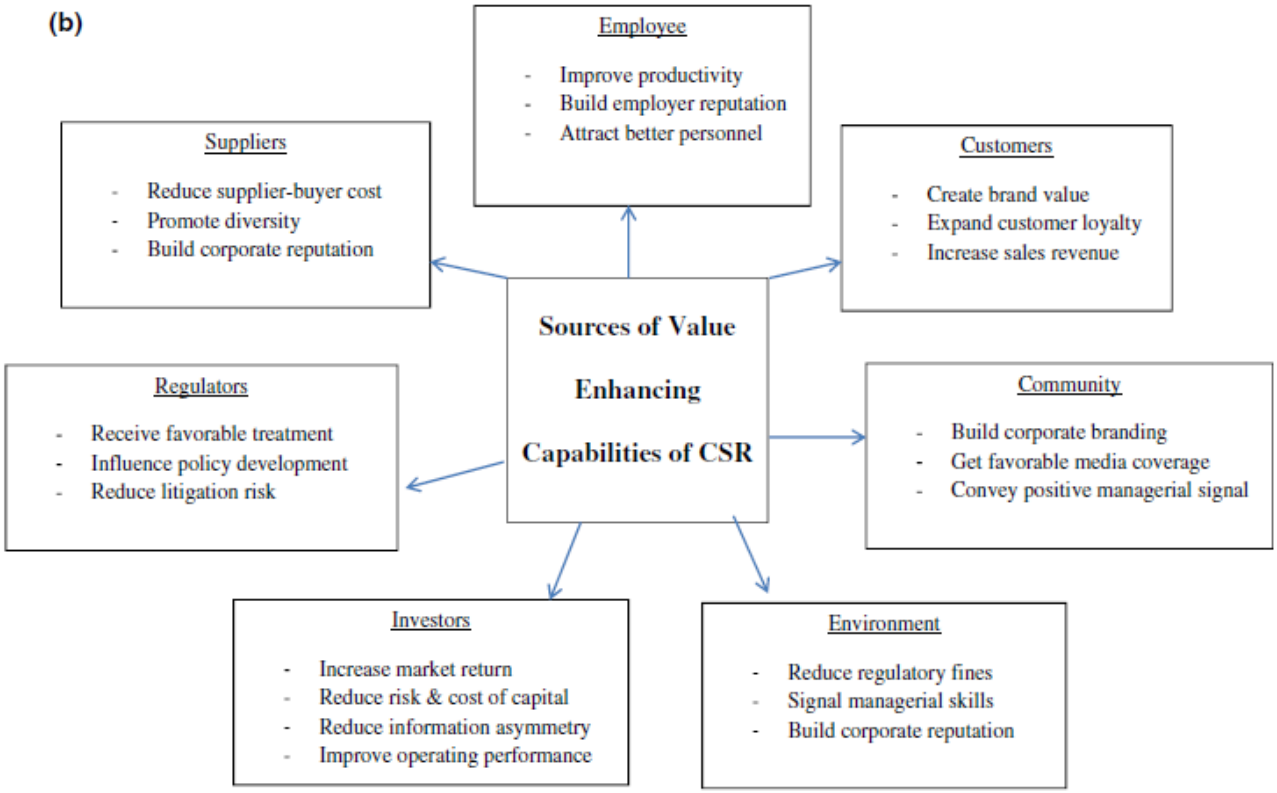

Figure 8. CSR benefits resulting in different value-enhancing sources (Malik, 2014)

4. PREVIOUS EMPIRICAL EVIDENCE

4.1. ESG value relevance

The relation between companies' environmental, social, and governance (ESG) and corporate financial performance is well documented according to Friede et al. (2015). Based on their analysis and as presented in Figure 10, this research stream saw first published articles in the 1970s and since then there are more than 2000 empirical studies and review studies to study the link between corporate social performance (CSP) and corporate financial performance (CFP). The empirical evidence has been mixed during the past 50-year and researches have posed different views on the link between ESG and CFP. Several authors have argued that ESG activities will lead to diminished returns for investors. For example, Brammer et al. (2006) found that higher social performance scores of firms lead to lower stock market returns while low scoring firms outperform the market. However, the recent research has provided evidence that there is a positive relation between ESG and CFP and this chapter provides an overview of this literature and previous empirical findings.

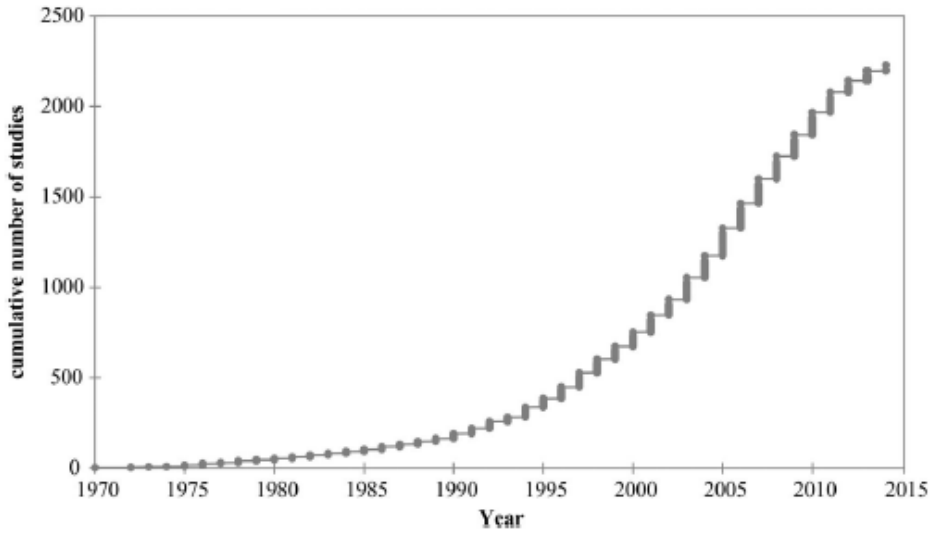

Figure 1. Estimated number of empirical studies on the ESG–CFP relation over time.

Figure 9. Estimated number of empirical studies on the ESG-CFP relation over time. (Friede et al. 2015)

Friede et al. (2015) performed an analysis of 2,200 empirical studies, which is to the date the most comprehensive study on ESG-CFP research. The authors found a positive ESG impact on CFP. The sample included 35 vote-count studies and 25 meta-analyses. About 90% of studies covered in the study showed a nonnegative ESG-CFP relation. In addition, authors show that the positive relation has been stable over time. As more investor are becoming aware of ESG, this increase in demand could lead to decreasing ESG alpha, as market would learn to incorporate ESG information to the valuations. The authors did not find evidence for this learning hypothesis indicating that ESG as an investment strategy has a business case and is attractive for investors to pursue.

Lins et al. (2017) studied the relation of companies' corporate social responsibility (CSR) and firm performance measured both by financial and operational point of views during 2008 - 2009 financial crisis. The authors view that financial crisis was a period with low trust towards companies and they present a hypothesis that companies with higher trust will perform better during uncertain times compared to their low-trust peers. The authors examined how companies' social capital and trust measured by their CSR scores as a proxy indicator affected firm performance during uncertain times. Their sample included 1,673 nonfinancial firms with CSR data available on MSCI ESG Stats database. Lins et al. (2017) found that those firms with higher CSR ratings before the crisis performed better than firms entering the crisis with low CSR ratings during the crisis-period. This outperformance during the crisis-period was significant and yielded between 4 – 7 percentage points. Moreover, to identify the reasons behind outperformance Lins et al. (2017) examined firms' operational performance and found that high-CSR firms have higher profitability and gross margins. In addition, these firms face higher sales per employee and are able to raise more debt. To summarize, the authors argue that social capital measured by CSR score matter more during crisis when investor confidence towards firms is low. This provides evidence that higher ESG performance can protect value during uncertain and volatile time periods.

Eccles et al. (2014) studied the impact of corporate sustainability on organizational processes and performance. Their study provides evidence on how sustainability as a management's strategic choice can contribute to the long-term success and performance of the company. Their sample contained 180 U.S. companies. First, they identified 90 companies who proactively adopted environmental and social policies starting from the early 1990s to mid-1990s, and refer these companies as 'high sustainability' companies. Next, they formed a matched sample of 90

companies of 'low sustainability' companies who did not adopt these policies. The authors see that the early adoption of sustainability related policies, before sustainability and different sustainability related policies became widespread, indicates a strategic choice of a company and that the company emphasizes non-shareholding stakeholders as a part of company's strategy.

Eccles et al. (2014) found that 'high sustainability' companies have more likely established processes for stakeholder engagement, are more long-term oriented, and disclose more nonfinancial information relevant to wider group of stakeholders. In addition, in 'high sustainability' companies, the board of directors is responsible of sustainability more often than in 'low sustainability' companies. The authors examined also companies' financial performance. They found that 'high sustainability' companies outperform 'low sustainability' companies over the long term measured by stock market performance and accounting performance.

As discussed earlier in this thesis, the concept of 'financial materiality' is important when discussing about ESG; materiality refers to the fact that the importance of certain ESG factors and material sustainability issues differs between companies and industries. In their seminal paper named "First evidence of materiality", Khan et al. (2016) examines how materiality of ESG factors affects companies' financial performance. Their study contributes to the existing literature, which have not identified the distinction between material and non-material ESG factors, i.e. which sustainability issues are the most important ones in a certain industry.

Khan et al. (2016) utilize SASB (Sustainability Accounting Standards Board) materiality mapping defining material ESG factors for several industries and sectors. Their sample contains 2,396 companies and the sample period is from 1991 to 2013. The authors find that firms with strong ratings on material sustainability issues performed better than firms with poor ratings. In addition, they found that those firms that have high ratings on non-material issues do not outperform firms with poor ratings. This signals that non-material sustainability investments do not create value. The finding highlights the need to understand how ESG is linked to company's core business and which ESG factors are the relevant to manage and develop from an individual company perspective and where investors should focus on in their ESG analysis. The authors also show that firms with strong ratings on material issues compared to poor ratings on non-material issues are the companies with best future performance. Overall, their findings indicate that considering material ESG information plays an important role for an investor to form a solid picture of the potential investment.

4.2. ESG and cost of capital

Cheng et al. (2013) provides evidence on the relationship between corporate social responsibility and access to finance. In their paper, they hypothesize that high CSR companies have better access to finance for two reasons. First, they face lower agency costs caused by improved stakeholder engagement, which limits the short-termism and opportunistic corporate behavior. Secondly, they face reduced informational asymmetries because they are more transparent and engage in improved CSR disclosure indicating long-term focus compared to low CSR companies. Based on their evidence, covering a sample period from 2002 to 2009 and 2,439 publicly listed companies from 49 countries, high CSR companies face significantly lower capital constraints, and this is due both to the better stakeholder engagement and to increased transparency. Their scope of work covered several metrics of capital constraints, including cost of equity and debt, firm's inability to borrow and issue equity, the dependence on bank loans, and illiquidity of assets. Moreover, they find especially that environmental and social dimensions of CSR drive capital constraints.

Also other scholars have examined the relationship between CSR and firm's cost of capital. El Ghoul et al. (2011) provided one of the first comprehensive studies to examine the link between CSR and firms' ex ante cost of equity capital. The authors found that high CSR companies have lower cost of equity capital. The CSR dimensions included in the study included social performance measured by community, diversity and employee relations; the environment; human rights; product characteristics; and controversial business issues. They found that CSR investments especially targeted to improve responsible employee relations, environmental policies, and product strategies substantially affects firms' cost of equity by decreasing it. In addition, they show that firms operating in 'sin industries' of tobacco and nuclear power face higher equity financing costs. Their sample includes 12,915 U.S firm-year observations during time period from 1992 to 2007. They conclude that their findings support arguments presented in prior literature that CSR affects positively firm value and the important mechanism for this is through CSR effects on firm risk.

Dhaliwal et al. (2011) provides further evidence on the relationship between firms' cost of equity capital and CSR by focusing on firms' voluntary non-financial disclosure (i.e. CSR reporting). Their sample includes U.S companies that have released standalone voluntary CSR reports since 1993 to 2007 and have CSR ratings data available in the KLD STATS database. The authors see

that CSR disclosure provides information about firm's long-term development strategies and performance sustainability, and thus differs from traditional voluntary disclosure focusing more on the short-term. They hypothesize that the possible reduction in cost of equity capital is an important motive for companies to disclose voluntary nonfinancial information, and moreover, that CSR disclosure leads to lower cost of equity capital. To provide evidence for their hypotheses they focus only on first-time CSR reports and exclude reports from subsequent years. In addition, they apply a broad set of measures covering different CSR dimensions including environmental protection; community development; corporate governance practices; employee relations; diversity practices; human rights; and product quality, to measure firms' CSR performance. Dhaliwal et al. (2011) found that those companies who face higher prior year cost of equity capital are more likely to disclose standalone CSR report next year. Firms with high CSR score compared to industry peers face smaller cost of equity capital after initiating CSR reports. These high CSR companies also attract institutional investors and analyst coverage. Finally, they found that companies who initiate CSR reports also exploit potential benefits associated to lower cost of capital by more likely conducting SEOs to raise capital within two years after the initial disclosure.

4.3. ESG and risk and volatility

Kim et al. (2014) investigated the relationship between corporate social responsibility and stock price crash risk (defined as a conditional skewness of return distribution). In their article, they present and empirically test two alternative views related to CSR and crash risk. First, firms with high CSR are more transparent and publish more reliable information, as well as, are less likely to release negative information to the investors, thus having a lower stock price crash risk (i.e. higher CSR performance mitigates crash risk). Second, the authors argue that if firms use CSR to cover poor management and corporate behavior, it is expected that the stock price crash risk is higher (as eventually the bad news will reach the investor). By using a sample of U.S public firms, their findings support the mitigating effect of CSR on crash risk. Authors found a significantly negative association between firms' CSR performance and one-year-ahead stock price crash risk indicating that companies with high CSR levels face lower crash risk. They also found that the results are significant only when the firm has a poor governance or lower level of long-term institutional

ownership. This finding highlights the importance of CSR if the firm has poor governance and monitoring by the boards or institutional investors.

Oikonomou et al. (2012) investigated the relationship between CSP and financial risk. By applying CSP ratings from KLD they constructed a sample covering the listed companies in the S&P 500 Composite Index in 1992-2009. They found that corporate social responsibility is negatively but weakly related to systematic firm risk and that corporate social irresponsibility is positively and strongly related to financial risks.

In addition, Lee & Faff (2009) constructed leading and lagging equal-weighted portfolios based on CSP scores. They found that firms' higher CSR scores are associated to significantly lower idiosyncratic risk. Becchetti et al. (2015) examined the idiosyncratic volatility. They found empirical evidence that idiosyncratic volatility is significantly and negatively correlated with corporate social responsibility.

5. HYPOTHESES DEVELOPMENT AND DATA

In the chapter 5, I will present the framework that works as a basis for the empirical part of this thesis. The framework combines the concepts of 'Business footprint' and 'Business handprint'. I will provide explanations, arguments and examples of why there is a growing need to understand the difference between these two concepts, i.e. footprint and handprint. As far as I know, the concept of business handprint in the academic research is still very limited and I will contribute to the growing discussion around the topic by presenting a framework that will support creating a more solid understanding of the concepts of footprint and handprint and to form basis for future research of sustainable business and sustainable investing.

The following chapters first summarize the background and motivation to build the framework for this thesis. Next, I will briefly present the concepts of footprint and handprint as they are currently utilized in the public and academic discussion. Finally, I will present the framework, build the hypotheses and present the data I will use in the empirical part of this thesis.

5.1. Background for the framework

As explained in the Chapter 2 "Sustainability and capital markets", concepts of sustainability and sustainable development started to emerge in the 1980s due to more visible societal issues and the growing attention of the citizens. Since then sustainability related challenges, ranging from climate change to human rights violations and growing inequality, have become more evident as the scale of human activities and business have grown significantly. Eggers & MacMillan (2013), argue that traditionally addressing societal issues has been the task of governments and explain that the massive public challenges including health epidemics and large infrastructure developments during the 20th century set governments at the center of solving social issues and providing public good.

When governments where taking more and more responsibilities of the common issues during the latter part of the 20th century, the large companies and private sector overall, was still heavily operating under the principle presented by Milton Friedman stating that the social responsibility of business is to increase its profits. On contrary to Friedman's now famous manifestation, the concepts of corporate social responsibility (CSR) and sustainable investing started to develop with

an accelerating pace since the 1990s as the growing public consciousness changed how the role of a business was seen in the society and the potential negative impacts of business activities were understood better. However, thinking beyond bottom line was for a long time perceived as a value-destroying act from the investor and corporate management point of view. Moreover, it took a long time before corporate sustainability and sustainable investing truly became a mainstream and claimed the positions they currently have.

Today, we see increasingly that governments are facing problems with growing budgets and still their ability to tackle the challenges of 21st century is limited and not sufficient taking into account the massive scale of complex and interdependent sustainability challenges. In their book called 'The solution revolution', Eggers & MacMillan (2013) see that a new economy is emerging around providing social outcomes and this economy blurs the old divisions between public and private sector responsibilities. In this new economy, more and more businesses and entrepreneurs exist to provide solutions to societal problems and new kind of collaborations emerge between different stakeholders including private sector, public sector, foundations and NGOs.

The very key idea behind this new economy is the fact that global challenges represent tremendous opportunities for business and, on the other hand, that private sector is largely needed to solve these complex problems to mitigate the risks that can be harmful for the whole planet. Companies are well placed to fill the gap between governments' ability to solve common problems and what people and society as a whole urgently need. In the public discussion, a popular term 'purpose-driven companies' has emerged to describe companies that focus on the true impacts (both positive and negative) of their business activities and apply a longer-term time vision for their business. These companies identify broader needs of a society and create a market for their solutions, services and products instead of solely trying to expand the existing market of existing solutions.

5.2.Building the framework: business footprint and handprint

To apply longer-term time horizon in their operations and to create positive societal impact to bridge the gap between sustainable development and global challenges, companies and investors need to redefine how they approach sustainability and ESG in general. By building on the

motivation presented in the previous chapter, I present the concepts of 'business footprint' and 'business handprint' in this section to answer to the need to redefine how sustainability is seen from company and investor perspective. By combining these two concepts, I build a framework that helps to analyze companies' actions and performance regarding sustainability. Not all sustainability matters count evenly in the business context, and focusing on the right topics is the key to unlock the potential companies have to support sustainable economic system.

In this thesis I argue, that there is a significant difference between avoiding harm related to own operations and creating positive societal impact through the core business activities. All business activities have both positive and negative impacts. To meet the needs of sustainable development, all companies should aim to minimize the negative impacts while maximizing the positive societal impacts. In this thesis, I use the term 'business footprint' to describe all negative external effects of business activities. Consistently, the term 'business handprint' refers to broader societal impact created by a company, especially through its products and services but also through stakeholder collaboration and by applying a longer term vision into its business strategy and activities.

In building the framework for this thesis, I am motivated by the previous contributions by Isdell (2010) and Phillips et al. (2013), who both have described the concepts of footprint and handprint in relation to business activities, global challenges and value creation in a same manner. [4] Moreover, Dyllick & Muff (2016) has built a typology presenting three different phases regarding companies' sustainability approaches and the effectiveness of companies' sustainability actions. Their work describes how sustainability maturity is developing towards emphasizing handprint.

Neville Isdell is the former chairman of the board of directors and CEO of The Coca-Cola Company, who retired from the company in 2009. In 2010, Isdell wrote an article called "Connected Capitalism: How business can tackle twenty-first-century challenges". In the article targeted to business leaders, he argues that the future of capitalism is at stake and business leaders should speak up and take part to the discussion of what kind of shape capitalism will take in the future. He argues that business leaders need to redesign their businesses to take into account the changing economic environment, and with a high priority, to connect their businesses to a broader

[4] For those who are interested to find out more information regarding handprint approach, I encourage to read the articles of Isdell (2010) and Phillips et al. (2013) as they link the concept of a handprint to a bigger picture and are able to explain its growing importance in clarity. In this chapter, I only briefly cover the key insights of those articles and mainly focus on to interpret their understanding and definition for the concept of handprint.

society and communities where they operate. To answer to economic realities, environmental challenges and expectations of different stakeholders and communities, Isdell says that the proper role of business in the 21st century should be threefold and build on the following goals: 1) address our footprint, 2) extend our handprint, 3) create a blueprint (engage partnerships and public policy).

As stated by Isdell (2010), "For a company, however, reducing their footprint is really the bare minimum that should be expected from them, and may be considered only a small first step." On the other hand, he sees handprint as actions that extends far beyond what the company directly affects. For Isdell, handprint present all those actions that allow a company to have a larger and scalable positive impact on society by acting as a catalyst, partnering with others, by leading and by innovating new solutions. He states that by focusing on handprint company can also change the way other companies or even industries work and through this handprint help all to move towards more sustainable future. Finally, Isdell concludes that "I believe that in this era of change it is the businesses that connect and adapt correctly with this broader social agenda that will survive and that will thrive in the coming decades." This idea is a key motivation when building my hypothesis.

Phillips et al. (2013) examine the future of financial industry in their article published in a book called "Responsible Investment Banking". The authors see that the global challenges will affect also financial institutions increasingly in the next 15 years. To prepare for an uncertain future and underlying challenges, they present a strategic tool called *handprint approach*. For the authors, handprint reflects "the economic, social and environmental added value generated by a financial institution". They contrast handprint to more traditional risk-centered sustainability approaches and argue that handprint approach will enable sustainability to act as a driver for business development, proactive reputation management and capacity building. Even though their focus is on the financial industry, they also cover examples of other industries and discuss how the concept of handprint can be utilized by different industries as well as the potential implications of this change to financial industry. The authors argue that handprint approach will act as a key tool to increase the future viability of financial institutions and to prepare them for a future where value creation is redefined.

In the same manner than Isdell (2010), Phillips et al. (2013) argue that "In such a future, mitigating negative social and environmental footprint will not be enough. Instead, companies will need to improve and report their social value added, i.e. their handprint." Based on the article, society is more and more holding companies accountable for the impacts their products cause in the society

(i.e. the handprint), instead of purely focusing on the impacts of the production process (i.e. the footprint). They argue that applying handprint perspective contributes in creating new ways for product development, communication and corporate strategy. Moreover, handprint presents a shift from avoidance strategy to an added value strategy.

In addition to the authors presented earlier, Dyllick & Muff (2016) addresses the same issue of the evolving role of corporate sustainability. They start their argument from the observation that even though sustainability has mainstreamed itself among major companies, the activities of these companies do not still reflect the urgency and the alarming state of the planet. On the other words, the current actions are insufficient and the authors call the difference between actions and the reality as a "big disconnect". To examine this observation and to provide answers, the authors present their view on how companies can make an effective contribution to sustainability, and when business can truly be defined sustainable.

To answer their question, Dyllick & Muff (2016) develop a typology of business sustainability. They state that companies have failed to create sustainable value in its broader meaning and they see that companies' sustainability approaches have been built largely on an inside-out perspective demonstrating only limited contributions to certain sustainability issues. Their typology presents three phases of business sustainability aiming to distinguish between companies that contribute effectively to sustainable development and those who do not. The phases present increasing relevance and contributions regarding solving sustainability issues, and they are as follows:

1. Business Sustainability 1.0 (Refined Shareholder Value Management)
2. Business Sustainability 2.0 (Managing for the Triple Bottom Line)
3. Business Sustainability 3.0 (True Sustainability)

Dyllick & Muff (2016) argue that companies have been focusing on reducing the business footprint, operational costs and business risks (e.g. through improved operational efficiency and better risk management processes) as well as pursuing certain sustainability related opportunities (e.g. new markets, customer preferences) mainly in order to increase shareholder value. The objective of these actions is purely economic. This presents Business Sustainability 1.0, where the

aim is to address certain sustainability issues in order to increase shareholder value. In the second phase, companies broaden the scope of their sustainability actions by considering the views of their stakeholders in decision making and aiming to pursue triple bottom line. In this second phase, value creation includes also social and environmental values next to the shareholder value. Compared to phase 1.0 the difference is that created value is not just side-effect of their business activities but a result of specific intentional actions that address the needs of different stakeholders.

Finally, in the phase 3.0, Dyllick & Muff (2016) argues that in order to a business to be truly sustainable, the perspective needs to be turn around to outside-in perspective, which would make companies to ask how they can contribute to society and effectively solve global challenges. The authors state that: "Truly sustainable business shifts its perspective from seeking to minimize its negative impacts to understanding how it can create a significant positive impact in critical and relevant areas for society and the planet." In this most advanced form of sustainability, companies translate global challenges into business opportunities, and by utilizing their core expertizes and resources, companies are able to build economically viable business cases around societal and environmental issues. The main purpose of a truly sustainable business is to make a positive contribution to sustainability, and while doing it to create both societal and economical value.

As Grönman et al. (2018) states, the concept of footprint is universally applied to describe negative environmental impacts, and that the lesser-known concept of handprint can be used to refer to positive impacts. As the latter concept is not well known at this point in the public discussion, I briefly describe in the following sub-chapters the origins of both of the concepts and explain and define how terms business footprint and business handprint are applied in this thesis.

5.2.1. Business footprint

Footprint has stabilized itself as one of the key terms in the field of sustainability during the past 20 years. Originally, and still today, the term footprint is usually used when discussing about environmental topics. To understand the general idea of a business footprint in the context of this thesis – I will provide a brief summary of how the term footprint has emerged and what it means.

Term *ecological footprint* is used to describe the relationship between how much nature humanity has and how much nature humanity uses i.e. it describes both the demand and supply of nature. (Global Footprint Network, 2019) The origins of the term are in the academics. Rees & Wackernagel (1996) developed the concept of ecological footprint and defined it as "the corresponding area of productive land and aquatic ecosystems required to produce the resources used, and to assimilate the wastes produced, by a defined population at a specified material standard of living, wherever on Earth that land may be located." The authors also developed the measuring technique to calculate the ecological footprints of human activity, which is still widely used today. The key idea of the concept of ecological footprint is that if the demand for natural resources is higher than the supply of these resources, eventually the supply (i.e. nature's capacity to renew the resources) is not able to meet the demand and this leads to *ecological deficit*.

McElroy et al. (2008) broadens the scope of footprint by addressing also social contexts and introducing a quantitative social footprint method for measuring and reporting companies' sustainability efforts. In their paper, the authors present that companies use different social capitals in order to run the business. Moreover, companies can have impact on these capitals, and this impact can be negative or positive. The capitals include 'human capital', 'social capital', and 'constructed capital'. The authors argue that organization's sustainability performance can be determined by its ability to manage these capitals. If organization is able to produce or maintain these capitals, the operations can be said to be sustainable, and if it diminished these capitals, the operations are unsustainable. As on outcome of their paper, the authors present the concept of a *social footprint method (SFM).*

By considering the previous academic discussion regarding footprint, I utilize a broad interpretation for a term business footprint. This means that I will use it to describe all negative external effects of business activities covering both environmental and social aspects. All business activities require inputs, whether they are environmental (e.g. energy, natural resources) or social (e.g. employees, suppliers). In addition, all business activities cause environmental and social impacts due to business activities. Business needs to identify these impacts in order to manage them efficiently. The ability to identify and manage environmental and social impacts defines company's footprint, which the company should aim to minimize through improving its operations.

The focus of a business footprint is in companies own operations and its operational efficiency. A company aiming to minimize its business footprint improves its existing operations by managing the material ESG topics, which lead to reducing negative impacts. As explained in the chapter 3.2. "Sustainable company as an object of sustainable investing", Halme & Laurila (2009) divides companies CSR maturity into three stages: 1) philanthropy, 2) CR integration, and 3) CR innovation. Company's efforts to minimize own business footprint falls into the second stage, i.e. the CR integration. Table 3 presents examples of actions that can contribute to a lower footprint.

Table 3. Examples on how company can mitigate the negative impacts of its business activities and through these actions to contribute to having a lower business footprint

Improving energy efficiency	Improving employee health and safety
Reducing emissions e.g. CO_2	Maintaining good employee relations
Improving resource efficiency	Ensuring proper working conditions
Improving waste management	Avoiding human rights violations

5.2.2. Business handprint

The concept of business handprint has not yet taken root in the academic discussion and research. To my best knowledge only a few authors have been discussing handprint in the context of business and the concept of handprint is still developing. In this section I briefly explain existing research.

VTT (2016), published a paper to provide an overview of the status of handprint concept and corresponding methodologies in Finland and globally. According to their research, the concept of handprint was originally brought to a day light at UNESCO's International Conference on Environment Education, in 2007. In the conference, a project called 'Handprint' was launched aiming to promote positive actions towards sustainability through education. The idea behind the concept of handprint is to measure and communicate the positive actions and corresponding impacts. The project defines handprint as "the symbol of, measure for, and commitment to positive action towards sustainability." (Handprint, 2019)

Norris (2015) describes his idea of 'Handprint-Based NetPositive Assessment". He states that "if we shrink our footprints while also growing our handprints, we can eventually do more good than harm, becoming NetPositive." Norris provides a definition for handprint as follows: "Handprints are footprint-consistent estimates of positive change." He presents that there are two ways to create a handprint. First, by "preventing or avoiding footprints that would otherwise have occurred, including reducing the magnitude of footprints that occur, relative to what their magnitude would otherwise have been". Secondly, by "creating positive benefits which would not otherwise have occurred". He uses term "business as usual" to refer to "what otherwise would have occurred" and states that handprints require voluntary (i.e. not caused by regulation) and intentional actions causing a change to business as usual. Finally, even though he presents two ways to create a handprint, he explains the difference between these two ways and answers to a question whether reducing your own footprint count as a handprint. He argues that by a strict definition, the first way i.e. reducing your own footprint does not count as a handprint as if the entity did not exists at all, there would not be any footprint at the first place.

Biemer et al. (2013) examines the environmental handprint and defines it as "the good we do for the environment". They see that handprint builds on the footprint thinking and it has two distinctive characteristics. First, the potential of the handprint is unlimited – meaning that whereas a company can only limitedly decrease its own footprint, the handprint it creates is scalable and does not have any upper limit. Secondly, handprints are associated with self-reinforcing positive feedback loops – meaning that positive action promotes other positive actions and over time and these positive changes accumulate by separate actions.

Recently, in the late 2018, Grönman et al. (2018) published a report stating, "The handprint concept has been simultaneously developed by multiple researchers and industries. This uncoordinated development work has led to a multitude of definitions and scopes for the handprint concept, which requires consistent clarification." In their paper, the authors work to consolidate the diverse discussion on handprint and provide their own definition for the concept of handprint as follows: "a handprint refers to the beneficial environmental impacts that organizations can achieve and communicate by providing products that reduce the footprints of customers". Although their paper focuses on environmental impacts, more detail in carbon, the definition connects the positive impacts to products that eventually reduce the customer's footprint.

The concept of business handprint helps companies to broaden the scope and scale and eventually the actual impact of their sustainability actions. Whereas possibilities to reduce ones footprint is limited, handprint offers scalable opportunities for companies. By focusing on the handprint, companies are able to contribute to society while promoting the broader benefits of its solutions.

According to Pajula et al. (2017), "The positive impacts and their communication as handprints can generate competitive advantage for companies, improve the brand and reputation and increase demand for the company's products." Applying a handprint concept to business requires adoption of broader and longer-term view of their core business activities and eventually on profit generation. Handprint requires forward-looking approach to business and it should be applied at the center of company's strategy, integrated to product development and utilized as a source and accelerator of technological innovation. As explained by Phillips et al. (2013), a company can learn from its different stakeholders, including customers and suppliers, when addressing both footprint and handprint. To properly utilize the handprint approach, requires companies to take into account the interest of all relevant stakeholders. Based on the stakeholder interests and needs of broader society, companies are able to develop new business models that build on providing solutions to global challenges and contribute to reaching the UN's Sustainable Development Goals (SDGs).

In this thesis, business handprint refers to broader societal impact created by a company, especially through its core business activities and collaboration with other stakeholders. When assessed against the classification by Halme & Laurila (2009), the handprint falls into the most advanced category of CR i.e. CR Innovation.

Table 4. Examples on how company can create broader positive societal impacts through its business activities and through these actions to contribute to having a higher business handprint

Developing new business models to provide solutions for societal challenges	Linking sustainability into corporate strategy and applying long-term business perspective
Integrating sustainability into R&D and innovation to create new products and services	Collaborating with stakeholders including employees, suppliers and local communities
Engaging in new partnerships with other companies and NGOs to find mutual benefits	Innovating products and services to segments that are currently rejected
Contributing to improve the industry practices	Enhancing capacity building

5.2.3. The framework

Building on the previous literature presented earlier in the Chapter 5, I build a framework, which combines the concepts of business footprint and business handprint and catches the idea of business sustainability typology presented by Dyllick & Muff (2016). In this sense, the framework can be used to make distinguish between business orientation towards footprint and handprint regarding sustainability, as well as, to assess the maturity or progressiveness of companies' sustainability approaches. The framework builds on assessing companies' actions regarding two dimensions: 1) business footprint, and 2) business handprint. By evaluating companies regarding these two dimensions, I am able to form four different categories, which are presented later in this section.

As stated earlier, business will always have a footprint even though companies seek to minimize the negative impacts related to their operation and production processes. The ability to minimize this footprint is limited and thus focusing on minimizing the footprint is insufficient approach to solving global sustainability challenges. On the other hand, business handprint do not have similar limits and through innovation and by introducing new business models aiming to solve these global challenges, businesses are able to create unlimited and scalable solutions, which create positive societal impact. By combining these two views, company has a clear objective to aim to minimize its footprint while maximizing the handprint. By doing this, companies can successfully contribute to sustainable development. Finally, it is good to highlight that handprint and footprint should be seen as a complementary ways of thinking, instead of seeing them as exclusive.

In this thesis, I use the term 'business footprint' to describe all negative external effects of business activities. Consistently, the term 'business handprint' refers to broader societal impact created by a company. The Table 5 summarizes these two concepts and their respective characteristics in this thesis by building on the notions of the literature presented earlier including especially the contributions of Dyllick & Duff (2016), Phillips et al. (2013) and Isdell (2010).

Table 5. Characteristics of business footprint and business handprint as defined in this thesis. Own illustration.

	Business footprint	Business handprint
Definition in this thesis	*All negative external effects of business activities*	*Company's actions that create broader societal impact*
Perspective	○ Inside-out	○ Outside-in
Focus of company actions	○ Minimizing harm and negative impacts of production process and own operations	○ Maximizing impacts of company's actions towards society through innovation and stakeholder collaboration
Time horizon	○ Short-term / medium-term	○ Long-term
Direction	○ Behind looking	○ Forward looking
Source of value	○ Risk mitigation, cost savings and improved operational efficiency	○ Business opportunities ○ New markets and customer segments
Strategic lens	○ Avoidance strategy	○ Added value strategy
Potential	○ Limited	○ Unlimited and scalable

By applying the concepts of business footprint and business handprint, I am able to create a framework to analyze companies' ability to minimize negative impacts and maximize positive impacts. The framework is presented in the Figure 10 below.

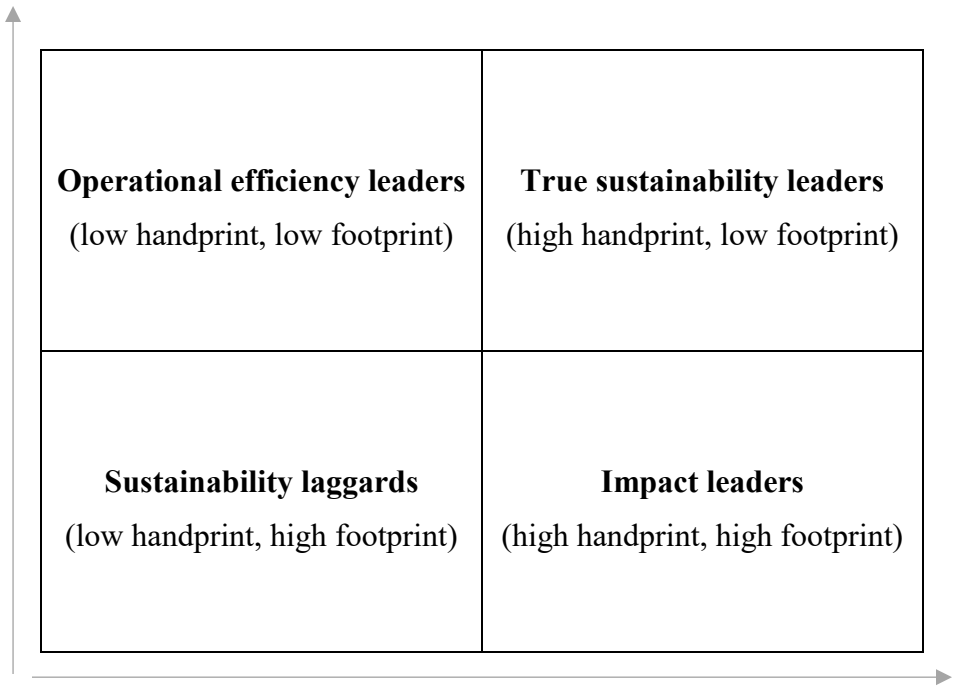

Figure 10. Framework to analyze companies' performance regarding business footprint and business handprint

The framework includes four different categories that are built around two dimensions. The X-axis presents company's performance regarding business handprint, the handprint improves when moving from the left to the right. The Y-axis presents company's performance regarding mitigating the negative externalities of its business activities, the footprint is high at the bottom and gets lower when moving upper in the Y-axis. Based on the framework presented above, I am able to form four different high-level theoretical categories to classify companies based on their sustainability approach and performance assessed by their ability to minimize footprint and maximize handprint.

I call these categories as a (1) *True sustainability leaders*, (2) *Operational efficiency leaders*, (3) *Impact leaders*, and (4) *Sustainability laggards*. I will briefly describe these theoretical categories to highlight their differences in the Table 6.

Table 6. Theoretical categories based on the Framework

(1) **True sustainability leaders: Strategic goal to minimize negative impacts and maximize positive impacts** • These companies have taken the leadership regarding sustainability and they have committed to improving their performance regarding both business footprint and business handprint. • Companies apply outside-in perspective to understand societal and environmental challenges and identifying business opportunities while solving the problems. • Companies have demonstrated their ability to minimize negative externalities of their own operations and continuously improve their performance. • Sustainability is integrated throughout the company, it is a core part of the business model and strategy, it is part of innovation and R&D process, and the company proactively engages with its stakeholders.
(2) **Operational efficiency leaders: Strategic goal to minimize negative impacts** • These companies have focused on improving their operational efficiency through ESG improvements, they have focused on risk mitigation regarding ESG and they aim to avoid any litigation or liabilities regarding ESG non-compliance cases • However, the ESG actions are not necessarily at a strategic level and a source of innovation and the company does not focus on creating societal impact through its core business activities.
(3) **Impact leaders: Strategic goal to maximize positive impacts** • These companies provide solutions to different sustainability challenges through their products and services, but at the same time, they are lacking efforts to minimize their own business footprint and manage the negative impacts.
(4) **Sustainability laggards: Strategic goal to meet the compliance** • As all companies are required to comply with regulation, I call the last group as sustainability laggards as they do not invest in sustainability and they have not integrated sustainability topics into their own operations. • Sustainability is not part either of the business strategy or operational issues

5.3. Hypotheses

Based on the discussion in the previous chapters, I argue in this thesis, that the changing business environment requires forward-looking strategies by companies, and that forerunning companies in that sense will be well-placed in the changing business environment comparing to companies that continue following the 'business-as-usual' paradigm. At the same time, however, it is increasingly important that companies are able to minimize the negative impacts of their business activities, as this can be seen as a minimum level of sustainability actions as argued by Phillips et al. (2013) and Isdell (2010). Stricter regulation in the future, increasing customer expectations as well as increasing transparency to company actions enabled by technological development, to name few, will change how companies' actions are judged and evaluated in the future. Overall, companies need to raise their sustainability performance to ensure the social-license-to-operate also in the future. This will change how investors evaluate and value different companies.

My first hypothesis builds on the previous research on the relationship between companies' ESG performance and financial performance measured by the stock returns. As presented by Friede et al. (2015), close to 90% of studies covered in their meta-analysis covering 2,200 studies found positive ESG impact on corporate financial performance. It is in my interests to test this previously shown relationship with the dataset I utilize in this thesis. Moreover, I aim to assess if there are any differences in this relationship in the case whether company's performs is measured by its footprint performance or regarding handprint performance, and thus my first hypothesis is as follows:

H_1: *Companies with higher ESG performance measured by the total ESG total score outperform their low performance counterparts measured by stock market returns.*

> **$H_{1.1}$:** *Companies with higher ESG performance measured by ESG footprint score outperform their low performance counterparts.*
>
> **$H_{1.1}$:** *Companies with higher ESG performance measured by ESG handprint score outperform their low performance counterparts.*

Some authors have noted that the first hypothesis investigating the link between company's current ESG performance and its future investment performance, expects that higher ESG performance increases returns over the long run. On the other hand, several authors have shown that investing on companies that have improved their ESG ratings the most can lead to higher returns than investing on those companies that have the highest ESG ratings at that time. (Nagy et al. (2016)

This 'ESG momentum' strategy targets companies that have improved their ESG score over a given time period. As explained by Nagy et al. (2016), ESG momentum strategy has more short-term focus compared to strategies focusing on the highest performing companies. Nagy et al. (2016) also show that ESG momentum strategy outperforms an investment strategy based on current ESG ratings. To test this finding about ESG momentum strategy outperformance, I will utilize the framework to analyze whether momentum strategy applies for portfolios constructed based on only footprint or handprint indicators. As momentum strategy focuses on short-term, I hypothesize that those companies that have been able to improve their footprint and handprint scores the most, will outperform those companies who have not improved their respective scores, and that this outperformance will be larger than the respective results regarding Hypothesis 1.

H_2: *Companies that have been able to improve their ESG total score during the past 12 months the most outperform those counterparts that have performed poorly regarding ESG total score during the same period measured by stock market returns.*

> **$H_{2.1}$:** *Companies that have been able to improve their ESG footprint score during the past 12 months the most outperform those counterparts that have performed poorly regarding ESG footprint during the same period*
>
> **$H_{2.1}$:** *Companies that have been able to improve their ESG handprint score during the past 12 months the most outperform those counterparts that have performed poorly regarding ESG handprint during the same period*

Integrating sustainability into strategic decisions and engaging with company's stakeholders implies company's capability for a longer-term thinking. As the operating environment is changing, I expect that those companies, who are able to focus on their handprint and ably longer-term focus in their operations, will outperform those companies that have focused on performing well regarding their own footprint. Thus I hypothesize that:

H_3: *Companies that score the highest both at the ESG footprint and ESG handprint scores will outperform their low scoring counterparts in other categories.*

5.4. Data

5.4.1. ESG data and construction of footprint and handprint measures

To assess the relationship between companies ESG performance and stock market performance, the availability of high-quality data is important factor to get reliable and meaningful results. In this thesis, I will utilize Thomson Reuters ESG Scores in order to identify which companies are classified as a high or low performing companies related to different ESG factors.

Thomson Reuters provides ESG Scores for individual companies to measure company's relative ESG performance, commitment and effectiveness across 10 main themes covering e.g. emissions, environmental product innovation, and human rights. The ESG Score data is based on company-reported data. In addition, Thomson Reuters provides aggregated ESG controversies score to describe ESG controversies across all 10 themes. By combining these two scores, Thomson Reuters provides ESG Combined Score by discounting the ESG Score with the ESG controversies score. According to Thomson Reuters, the current coverage is over 7,000 companies globally with time series data starting from 2002. (Refinitiv, 2019) The Figure 11 below outlines the Thomson Reuter's methodology to form these scores.

As the hypothesis presented in the previous chapter build on the framework classifying companies based on their performance regarding footprint and handprint, my aim in this thesis is to build a dataset that allows me to test my hypothesis.

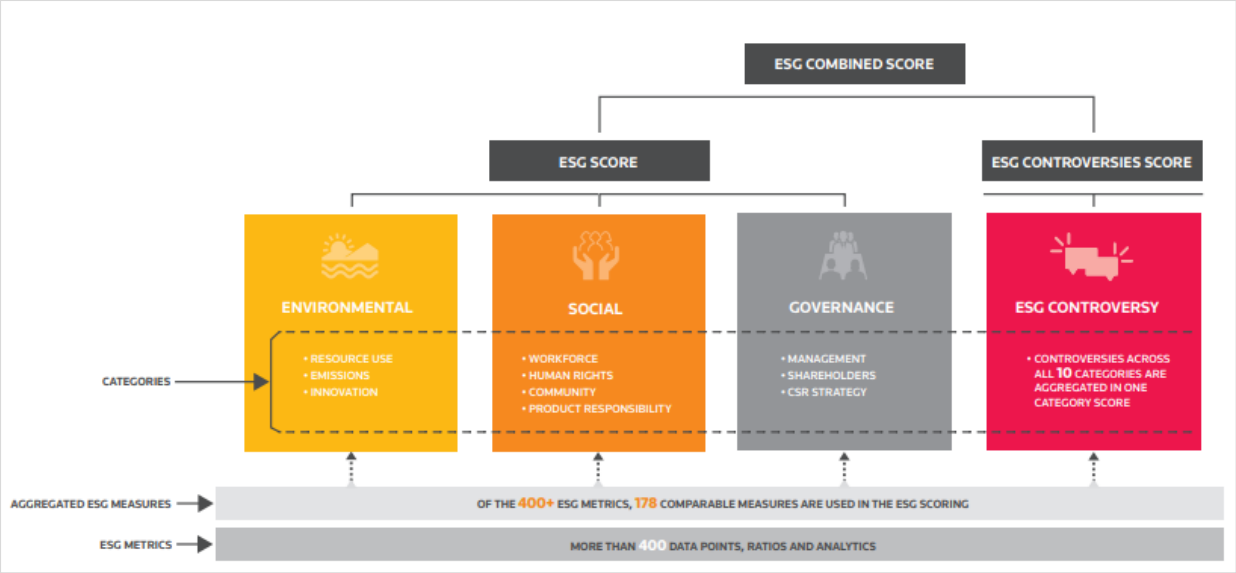

Figure 11. Thomson Reuters ESG data (Refinitiv, 2019)

Measuring footprint is easier as it includes data that companies are used to report and that is overall easier to measure and collect. On the other hand, there is no direct and established way to measure companies' handprint and broader societal impact as defined in the context of this thesis. To be able to measure the performance on both footprint and handprint dimensions, I will divide the Thomson Reuters ESG scores of each theme into two groups based on my assessment whether they reflect more footprint dimension or handprint dimension as understood in this thesis.

First, identifying data points that can be classified as a footprint is an easier task. The Table 7 on the next page presents the individual ESG scores that I have selected to include in my analysis to describe company's performance on footprint dimension, and their definition as it is provided by Thomson Reuters. Overall, these indicators can be used as a direct measures for company's ability to minimize the negative impacts of its operations. Higher score entails lower footprint.

Next, I will select the ESG scores that can be used as a proxy indicators to describe companies' performance on handprint dimension. As handprint represents longer-term orientation of a business and considers the needs of its external stakeholders, I have selected four indicators as a proxies for company's ability to create societal impact outside of its own operations. These indicators are 1) vision and strategy, 2) product innovation, 3) community, and 4) product responsibility score. Table 8 lists the indicators and respective definition as provided by Thomson Reuters.

Table 7. Summary of ESG factors to describe company's footprint performance and definition as provided by Thomson Reuters

Score	Definition by Thomson Reuters
Resource reduction	The Resource Use Score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
Emission reduction	The Emission Reduction Score measures a company's commitment and effectiveness towards reducing environmental emissions in the production and operational processes.
Workforce	The Workforce Score measures a company's effectiveness towards job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.
Human rights	The Human Rights Score measures a company's effectiveness towards respecting the fundamental human rights conventions

Table 8. . Summary of ESG factors to describe company's handprint performance and definition as provided by Thomson Reuter

Score	Definition by Thomson Reuters
Vision and strategy	The CSR Strategy Score reflects a company's practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes.
Product innovation	The Innovation Score reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products.
Community	The Community Score measures the company's commitment towards being a good citizen, protecting public health and respecting business ethics.
Product responsibility Score	The Product Responsibility Score reflects a company's capacity to produce quality goods and services integrating the customer's health and safety, integrity and data privacy.

From the Thomson Reuters I am able to gather individual ESG scores for each of these eight indicators. The next step is to form aggregated scores of these indicators to represent company's performance on a footprint dimension and on a handprint dimension. In order to do this, I simply calculate averages of the four indicators on both of the dimensions. Footprint score (1) and handprint score (2) used in the empirical part of this thesis are calculated using the following formulas:

$$Footprint\ score = \frac{Resource\ reduction + Emission\ reduction + Workfoce + Human\ rights}{4} \quad (1)$$

$$Handprint\ score = \frac{Vision\ and\ strategy + Product\ innovation + Community + Product\ responsibility\ score}{4} \quad (2)$$

5.4.2. Sample collection

I will test my hypothesis using a data from European market. There are significant differences between regions and geographies related to average ESG performance of companies, and in that reason, I will focus on the European market as European companies have relatively high ESG performance compared to other regions and as presented by GSIA (2018) sustainable investing is well established in the European market.

As my intention is to study European companies covering a large sample size, I choose to include all companies in the STOXX Europe 600 index into my initial sample. Large sample size of individual companies is important to ensure that there are sufficient amount of companies with different combinations of footprint scores and handprint scores in the sample. STOXX Europe 600 represents large, mid and small capitalization companies across 17 countries of the European region: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and the United Kingdom. (STOXX, 2019) The sample period covers years 2003 to 2018. For the ESG scores the data frequency is one year as this is the typical frequency to update different ESG scores by Thomson

Reuters. For stock market returns, the data frequency is one month. Stock market data is retrieved from the Thomson Reuters DataStream using Total return Index (TRI).

5.4.3. Sample characteristics

The key variable in my dataset is annual ESG scores for individual companies. ESG data is available starting from the year 2003 until 2018. The availability and coverage of ESG data has increased notably during these years. In 2003, there is ESG data available only for 248 companies from the total of 600 companies covered in the STOXX Europe 600 Index. In 2017, the corresponding number is 583, which indicates that almost all companies in the index are covered by Thomson Reuters ESG data. For the year 2018, ESG data is available for only about 200 hundred companies as the data points are updated usually in the first or second quarter of the year based on the availability of companies' annual reports, sustainability reports etc. For that reason, 2017 is the last year of ESG data in my sample.

Table 9 presents a summary of the sample characteristics related to ESG data. Overall, the average ESG score has increased significantly from 55.8 in 2003 to 66.6 in 2017 indicating that companies have been able to improve their ESG performance.

Table 9. Summary of sample characteristics regarding ESG data, 2003-2017

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Amount	248	335	405	411	441	450	456	472	485	493	500	519	544	560	583
ESG Score average	55,8	56,6	57,1	57,5	57,9	60,1	61,9	62,9	62,8	62,9	63,2	63,0	64,8	65,8	66,6
Footprint average	59,9	61,1	60,7	61,9	62,5	65,6	68,0	69,5	69,4	69,1	69,6	69,0	72,1	74,9	75,5
Handprint average	59,3	60,6	60,2	60,6	62,4	64,6	68,0	68,4	67,9	68,3	69,1	68,3	71,4	73,6	73,8
Correlation (footprint, handprint)	0,68	0,73	0,75	0,78	0,80	0,81	0,81	0,78	0,82	0,79	0,79	0,79	0,82	0,80	0,77

The same trend of increasing ESG scores is visible when examining average footprint and handprint scores. Overall, the footprint score is every year higher than the handprint score. The only expectation is year 2008, when the two scores equals. In 2017, the average footprint score is 75.5 whereas the average handprint score is 73.8. This signals that when considering the indicators that are applied in this thesis to describe companies' footprint and handprint performance, companies seem to be performing better on the footprint dimension. Even though the difference is quite minor, it is expected as traditionally companies have been focusing on the aspects that are classified as a footprint in this thesis, e.g. emission and resource reduction and employee health and safety.

The table also highlights the correlation between footprint score and handprint score, yielding between 0.68 and 0.82. High correlation is natural, as typically these two dimensions move quite closely hand in hand. On the other hand, when examining the dataset, there can be clearly spotted differences in how companies perform regarding these two dimensions.

As can be noticed from the Table 9 above, average ESG scores are significantly lower compared to footprint and handprint scores calculated separately based on individual data points. The reason for this is probably the updated calculation methodology of Thomson Reuters. The data used to calculate footprint and handprint scores are not necessarily yet updated by Thomson Reuters to reflect the new calculation methodology. As ESG scores and footprint/handprint scores are not directly compared to each other, this does not affect the results of this thesis. Moreover, as explained in the next chapter, I build portfolios by ranking companies based on their ESG performance, and thus the absolute level of ESG score does not define whether a company is included in a portfolio but the relative performance against other companies will. For that reason, the comparison of ESG total score, footprint score, and handprint score is justified.

6. METHODOLOGY AND EMPIRICAL RESULTS

In this section I present the methodology used in the empirical analysis as well as present and discuss the results. As a methodology in this thesis I use portfolio study combined with Fama-French three-factor model analysis. To test my hypothesis I will build and analyze the stock market performance of portfolios, which are built by ranking companies based on their ESG scores. For each hypothesis, I construct Low-ESG and High-ESG portfolios of the companies included in the STOXX Europe 600 index.

6.1. Overview of the methodology

In the empirical part of this thesis, I create value-weighted portfolios by ranking the companies according to their performance measured by their ESG scores. My intention is two-fold. First, I want to understand whether there is difference in relation to measuring ESG performance by the ESG total score, ESG footprint score, or ESG handprint score. Thus I build the portfolios separately for these metrics to compare the results. As explained in the previous chapter, ESG footprint and handprint scores catch different elements of the business, and therefore I expect there can be differences on how the companies perform in the stock market. Second, my intention is to test the relative performance of Low-ESG and High-ESG portfolios as well as to study their performance against the market index i.e. to analyze whether there exists any abnormal returns that the Fama-French three-factor model does not explain.

To construct the value-weighted portfolios I first obtain the monthly returns and the market capitalizations for each individual stock in my sample. Next, I build the portfolios by ranking all companies in my sample in relation to their ESG performance. The ESG performance is measured by the ESG scores retrieved from the Thomson Reuters as explained in the chapter 5.4. The portfolio construction process is exactly same for hypothesis 1 and hypothesis 2. In these cases, I pick 20 % of the highest and lowest performing companies for each portfolio. This means that each portfolio includes 125 individual stocks. Hypothesis 3 applies a different method to build the portfolios as I will do the selection by ranking the companies based on their performance on both

dimensions, footprint as well as handprint. This portfolio construction methodology applying double-sorting is described in the chapter where I present the results regarding hypothesis 3.

When constructing the portfolios, I will use previous year's ESG scores to build the following year's portfolio meaning that there will be one year lag. On the other words, company's ESG performance in year *t* affects whether the company is included in the portfolio in *t+1*. Thomson Reuters provides ESG data starting from the years 2003 and the last year of the ESG scores used in this thesis is 2017. This means that my portfolios will cover the years from 2004 to 2018.

I will rebalance the portfolios every 12 months as this is the frequency when ESG data is updated. The Thomson Reuters ESG dataset is typically updated during the first half of the year when companies publish their annual and sustainability reports. Thus I have selected to rebalance the portfolios at the end of March each year. I have selected this date, as I expect that the previous year's scores are available at that time and investor have access to information, which works as a basis for constructing the portfolios. However, in reality the scores are updated on on-going basis meaning that for different companies the ESG data is not available at a same time.

After I have built the Low-ESG portfolios and High-ESG portfolios, I calculate for each portfolio the average monthly returns and volatilities. Next, I perform regression analysis using Fama-French three-factor model to assess whether higher ESG performance creates excess returns. If ESG is value relevant in investment decisions, the portfolios would create a positive alpha (α), and if ESG does not provide value relevant information, the alpha is negative. The Fama-French three-factor model states that:

$$ESGPORT_t - rf_t = \alpha + \beta 1\, MRKRET_t + \beta 2\, SMB_t + \beta 4\, HML_t + \varepsilon_t \quad (3)$$

In the equation (3), ESGPORT refers to the portfolio constructed based on the ESG ratings, SMB refers to small-minus-big capitalization portfolios whereas HML refers to high-minus-low book-to-market portfolio. I obtain these factors as well as monthly risk-free rate from Kenneth R. French data library by selecting the European factors. As a market return, MRKRET, in the equation, I use monthly returns of STOXX600 Europe index obtained from Thomson Reuters as a market return.

6.2. Hypothesis 1

My first hypothesis states that companies with higher ESG performance outperform their low performance counterparts. Moreover according to my sub-hypothesis, I study this by measuring the performance using separately the ESG total score, ESG footprint score, and ESG handprint score. In this chapter I present the graphs of raw returns of each portfolio during the sample period from 2004 to 2018 as well as the results from the Fama-French three-factor model analysis.

The Figure 12 describes the cumulative returns of low-ESG and high-ESG portfolios measured by the ESG total score as well as the index return. The graph shows that Low-ESG portfolio significantly outperforms the index (181.6% and 106.0%, respectively), whereas the high-ESG portfolio follows the index closely during the whole sample period. The average monthly return for Low-ESG portfolio is 1.081% while the High-ESG portfolio yields 0.634%. At the same time, the return of the STOXX600 index is slightly smaller compared to the High-ESG portfolio yielding 0.631% average monthly return. The results implicate that the companies with a higher ESG score, follow more closely the index whereas low-ESG companies seem to outperform the index significantly. The potential reasons of this difference are discussed next together with the results of Fama-French three-factor model.

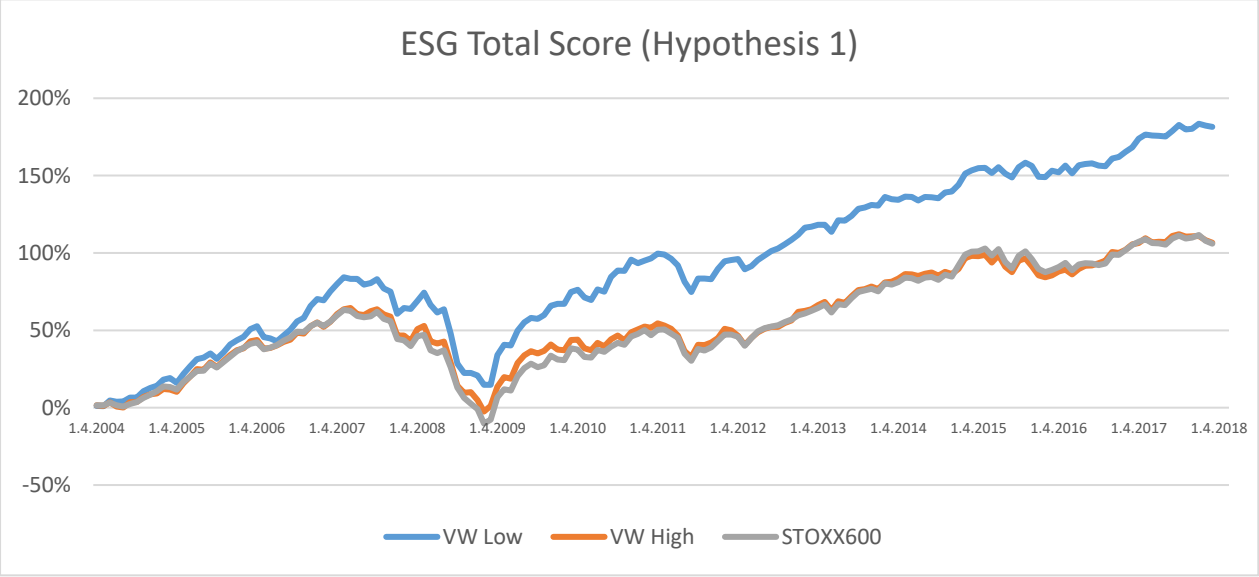

Figure 12. ESG Total Score, Hypothesis 1

Table 10 presents the results of Fama-French Three-factor model. Both Low-ESG and High-ESG portfolios create a positive alpha (0.303% and 0.042%, respectively), with the first coefficient significant at the 1% level. This indicates that both portfolios provide investors an excess return, even though the alpha is quite low.

The *SMB* coefficient of the Low-ESG portfolio is 0.6008 with a 1% level whereas High-ESG portfolio's *HML* coefficient is 0.1512 also with 1% level. This implies that Low-ESG portfolio has a significant tilt towards small-cap stocks whereas High-ESG portfolio has a positive tilt towards value stocks. The results of the regression signals that Low-ESG portfolio includes more small-cap and growth companies, and High-ESG portfolio includes more large-cap stocks and value stocks. In general, small-cap companies are associated with higher growth and thus provide investors higher returns, as is the case regarding Low-ESG portfolio. On the other hand, small-cap companies are considered to have greater risk and volatility. This can be observed also from the coefficient of *MRKRET* as the beta of Low-ESG portfolio is 1.08 whereas High-ESG portfolio has a beta of 0.94, indicating that Low-ESG portfolio is riskier and more volatile.

Table 10. ESG Total score, Hypothesis 1

ESG Total score (Hypothesis 1.)						
Portfolio	Avg. monthly return	Volatility	α	MRKRET-Rf	SMB	HML
Low-ESG	1,081 %	0.0455	0.303% (2.50) ***	1.0843 (32.75) ***	0.6008 (8.98) ***	-0.0691 (-1.13)
High-ESG	0,634 %	0.0402	0.042% (0.52)	0.9354 (43.05) ***	-0.0461 (-1.05)	0.1512 (3.76) ***
High-ESG – Low-ESG	-0,446 %	0.0191	-0.262% (-2.31) **	-0.1489 (-4.80) ***	-0.6469 (-10.32) ***	0.2204 (3.84) ***

Figure 13 presents the cumulative returns of portfolios constructed based on the ESG footprint scores. There are few clear differences compared to the previous results using ESG total score to rank companies. First, both Low-ESG and High-ESG portfolios yield higher average monthly

returns, 1.153% and 0.709% respectively, compared to returns of 1,081% and 0.634% measured by ESG total score.

In cumulative terms over the sample period, the returns are 193.6% and 119.1%, and in this case also the High-ESG portfolio outperforms the index. Interestingly, the pattern of High-ESG portfolio's cumulative returns is quite similar compared to ESG total score until early 2016. After that the returns of the High-ESG portfolio diverge positively from the STOXX600 index. One potential explanation for this might be that companies who have focused on improving their ESG footprint are eventually able to realize efficiencies in their own operations and to reduce costs through improved ESG performance. This would directly affect also the financial performance of these companies, which could lead to improved profitability and increased investor interest towards these companies. On the other hand, as ESG footprint focuses on meeting compliance and mitigating ESG related risks, it might be that investors are anticipating the potential changes in regulation or stakeholder expectations. For example the Paris Climate agreement and the launch of UN Sustainable Development Goals took place at the end of the year 2015, which are considered as an important milestones regarding sustainable investing.

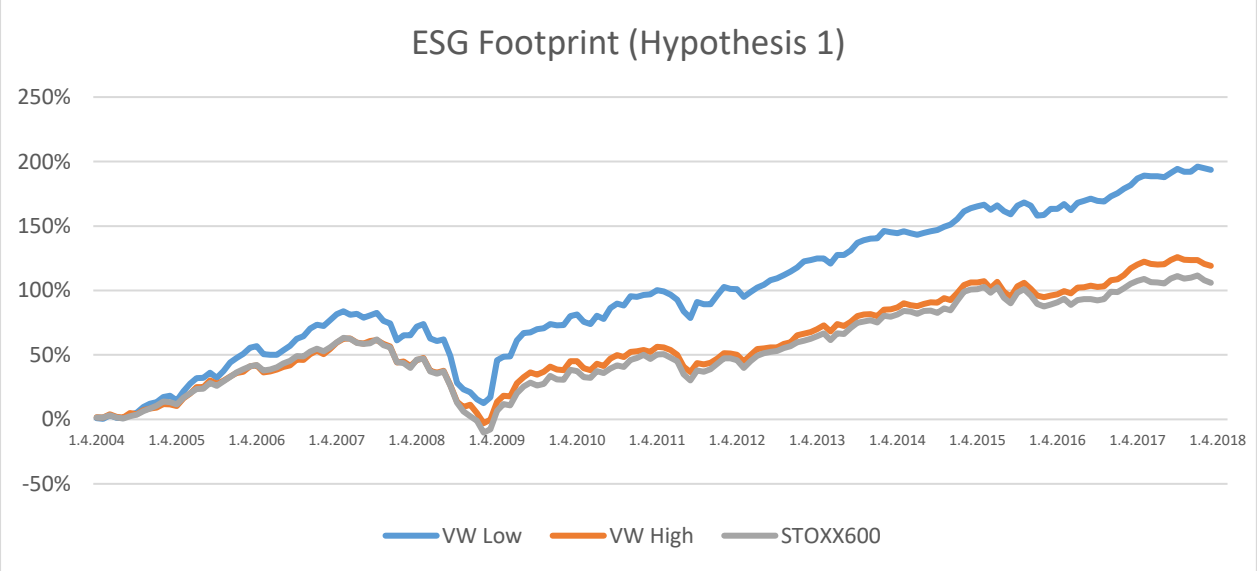

Figure 13. ESG Footprint, Hypothesis 1

Table 11 presents the results of Fama-French three-factor model regarding ESG footprint portfolios. The coefficient of alpha in High-ESG portfolio is 0.130% indicating that higher ESG footprint performance creates excess returns over the market return. Moreover, the alpha of Low-ESG portfolio is positive (0.380%) and significant at 1% level. The alpha coefficient of High-ESG portfolio is higher than the comparable portfolio constructed based on the ESG total score. This signals that ESG footprint information contains more value relevant information for investors compared to using pure ESG total score. Also in this case, Low-ESG portfolio tilts significantly towards small-cap stocks whereas High-ESG portfolio tilts even further away from small-caps than in the case of ESG total score regression.

When examining the volatilities of these two portfolios, Low-ESG portfolio has higher volatility and High-ESG portfolio lower volatility compared to corresponding portfolios measured by ESG total score. Combined with the results of Fama-French three-factor model, it seems that integrating ESG footprint scores into portfolio selection process, provides more relevant information to investor than just ESG total scores. By assessing ESG footprint scores investor is able to have higher average return and lower volatility compared to the ESG total score.

Table 11. ESG footprint, Hypothesis 1

ESG Footprint (Hypothesis 1.)						
Portfolio	Avg. monthly return	Volatility	α	MRKRET-Rf	SMB	HML
Low-ESG	1.153 %	0.0482	0.380% (2.51) ***	1.0939 (26.46) ***	0.5154 (6.17) ***	0.0758 (0.99)
High-ESG	0.709 %	0.0389	0.130% (1.65) *	0.9303 (43.02) ***	-0,0907 (-2.07) **	0.0294 (0.73)
High-ESG – Low-ESG	-0.443 %	0.0215	-0.250% (-1.79) *	-0.1635 (-4.29) ***	-0.6061 (-7.87) ***	-0.0464 (-0.66)

Figure 14 presents the cumulative returns of portfolios constructed based on the ESG handprint scores. The pattern of returns is quite similar to ESG footprint portfolio. However, in this case the average monthly return of Low-ESG portfolio is clearly smaller, yielding 1.088%, compared to 1.153% of Low ESG-footprint portfolio. Moreover, the returns of High-ESG portfolio are the highest compared to corresponding portfolios constructed based on the total score and footprint. Furthermore, the difference between High-ESG and Low-ESG portfolios is, on the same reason, smaller than in the two other cases. Also in this case, there is a clear pattern of High-ESG portfolio to diverge from the index after 2015-2016.

Table 12 presents the results of Fama-French Three-factor model regarding ESG handprint portfolios. High-ESG portfolio has a positive and significant *HML* coefficient (0.1412) at the 1% level as was also the case in the total score portfolio. Higher handprint performance signals strategic focus to sustainability and for that reason it is natural that this portfolio includes more value stocks. Interestingly, Low-ESG portfolio has the lowest *SMB* coefficient, but still clearly positive and significant. As a difference to total score and footprint portfolios, the Low-ESG and High-ESG portfolios constructed based on handprint scores have almost equal market betas and exactly the same volatility.

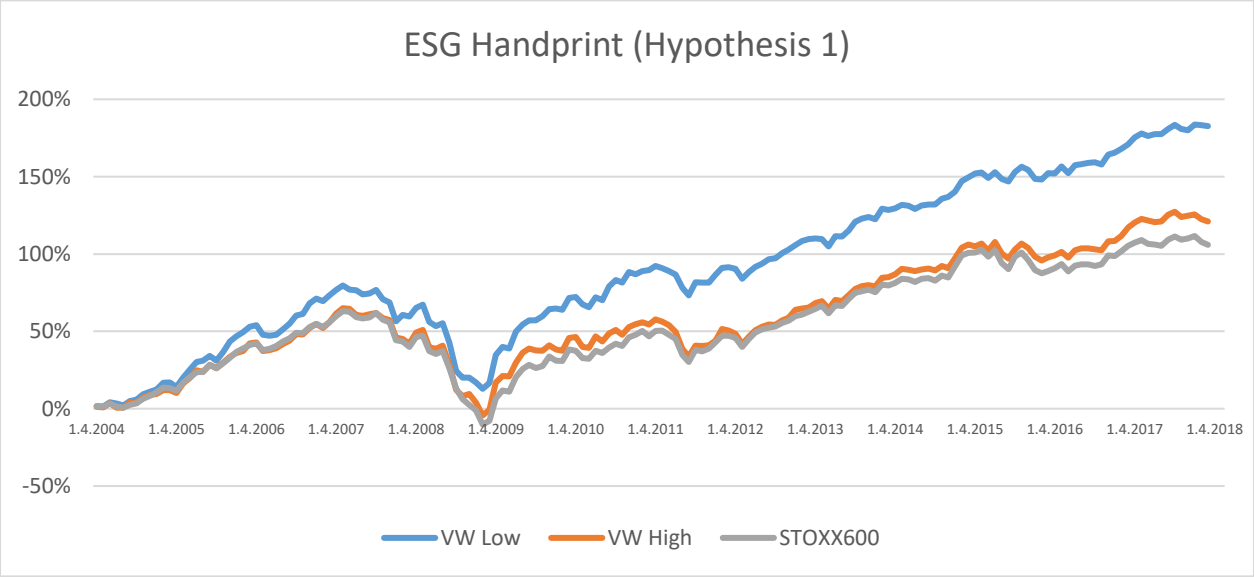

Figure 14. ESG handprint, Hypothesis 1

Table 12. ESG handprint, Hypothesis 1

ESG Handprint (Hypothesis 1.)						
Portfolio	Avg. monthly return	Volatility	α	MRKRET-Rf	SMB	HML
Low-ESG	1.088 %	0.0424	0.389% (3.39) ***	1.0021 (31.96) ***	0.3843 (6.06) ***	0.0094 (0.16)
High-ESG	0.720 %	0.0424	0.084% (0.96)	0.9932 (41.67) ***	0.0275 (0.57)	0.1412 (3.20) ***
High-ESG – Low-ESG	-0.368 %	0.0151	-0.305 (-2.89) ***	-0.0089 (-0.31)	-0.3568 (-6.10) ***	-0.1318 (-2.46) ***

To summarize the results regarding Hypothesis 1, there are some clear observations. First, the coefficient of MRKRET-Rf is in all cases higher for Low-ESG portfolio than for High-ESG portfolio. This indicates that investors are facing less risk and volatility when investing in High-ESG companies. Second, Low-ESG portfolio and High-ESG portfolio both create in in all cases a positive alpha, Low-ESG at 1% significance level whereas High-ESG coefficients are not statistically significant. Moreover, the alphas of Low-ESG portfolios are always higher than those of High-ESG portfolios. For that reason, the coefficient of High-ESG – Low-ESG portfolio is in all three cases negative indicating that, contradictory to the hypothesis 1, Low-ESG companies outperform High-ESG companies when measured by stock market returns. This outperformance is largely explained by the observation that returns of Low-ESG portfolios are largely explained by the size effect as the Low-ESG portfolios tilt heavily towards small-cab companies.

Finally and interestingly, also High-ESG portfolios outperform the market index. Among High-ESG portfolios, the average monthly return is highest for a portfolio constructed based on the ESG handprint scores, which yields a monthly return of 0.720%. On the other hand, this portfolio has smaller alpha compared to ESG footprint portfolio (0.084% and 0.130%, respectively). This signals that from the investor perspective, investing in High-ESG companies based on their footprint scores might be an attractive investment strategy, especially as this portfolio has the lowest volatility and market beta when comparing all six portfolios constructed in hypothesis 1. To conclude, from the investor perspective, both ESG footprint and ESG handprint scores provide more valuable

information for an investor than ESG total scores including both of these dimensions. One explanation might the materiality of ESG factors as presented by Khan et al. (2016).

6.3. Hypothesis 2

Hypothesis 2 examines the ESG momentum strategy. The construction of the portfolios follow the same process as for the portfolios in Hypothesis 1. The only notable difference is that the sample period is one year shorter because of the 12-month lag, which is needed to assess the changes in the ESG scores. Whereas in the previous hypothesis I used e.g. year 2003 ESG ratings to construct the portfolio for the year 2004, now I first calculate the difference between each company's ESG ratings by comparing two consecutive years e.g. 2003 and 2004. Based on that signal I build the year 2005 portfolio by ranking companies according to those who have increased their rating and to those whose rating has declined. Again, the portfolio is rebalanced each year similarly as in Hypothesis 1. In High-ESG portfolio and Low-ESG portfolio, I include 20% of the companies in the sample i.e. 125 companies.

The Figure 15 shows the cumulative returns of the index as well as High-ESG and Low-ESG portfolios constructed by using ESG total scores. As the sample period is one year shorter covering the years 2005-2018, the cumulative return of the STOXX600 Europe index is smaller than in Hypothesis 1., yielding a cumulative return of 92,6% (106,0 % between 2004-2018). As the Figure 15 clearly indicates, both Low-ESG and High-ESG portfolios almost double the cumulative returns of the index and outperform it significantly. Average monthly returns for Low-ESG and High-ESG are 1.257%, 1.170%, respectively.

Interestingly, the biggest difference compared to the Hypothesis 1, is that the High-ESG portfolio follows closely the Low-ESG portfolio, whereas in the hypothesis 1, returns of High-ESG portfolio were very similar to the market index. To conclude the findings based on the raw cumulative returns, it seems that both those companies who have increased their ESG ratings the most, and those whose ESG ratings have declined, outperform the market index significantly. During the years 2005-2009, both portfolios followed the index quite accurately, but prior to the financial crisis the index started to decline faster than either of the portfolios. Also the cumulative market returns of the STOXX Europe 600 index fell more strongly and yielded negative cumulative returns

during the time period from October 2008 to June 2009. At the same time both ESG portfolios lost their value but maintained positive cumulative returns during the financial crisis. As discussed in the literature review, Kim et al. (2014) found that those companies that entered the crisis with higher ESG ratings, performed better during the crisis period. Based on the findings, it seems that the ability to improve ESG ratings has same kind of value protecting capabilities.

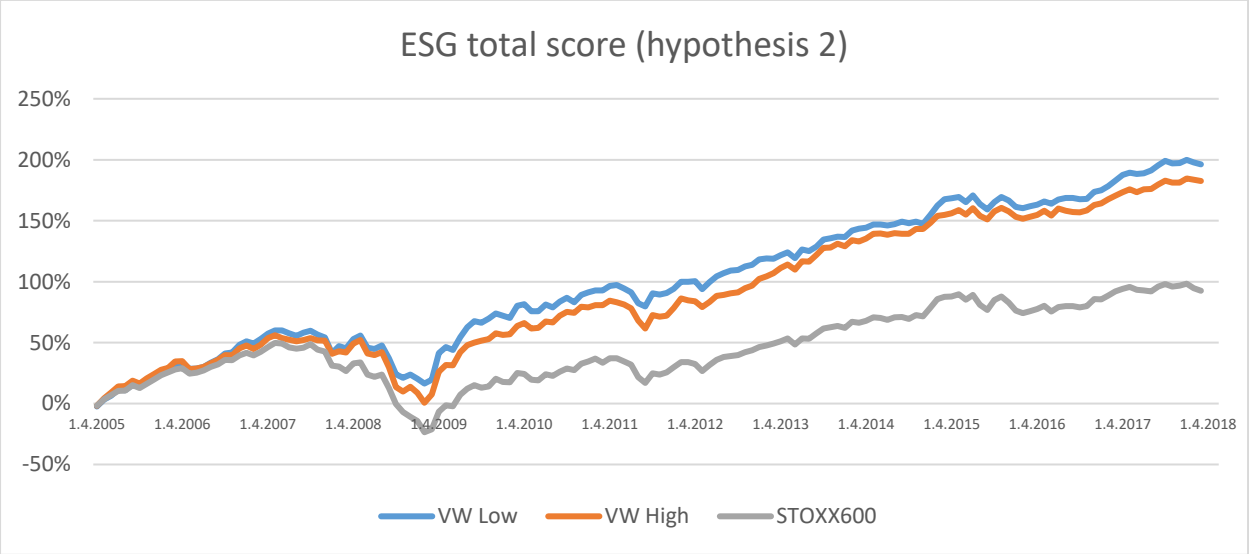

Figure 15. ESG Total score, Hypothesis 2

Table 13. ESG Total score, Hypothesis 2

ESG Total score (Hypothesis 2.)						
Portfolio	Avg. monthly return	Volatility	α	MRKRET-Rf	SMB	HML
Low-ESG	1.257 %	0.0438	0.670% (5.48) ***	0.9707 (29.95) ***	0.0801 (1.20)	0.1456 (2.42) ***
High-ESG	1.170 %	0.0437	0.561% (4.63) ***	0.9988 (31.07) ***	0.1092 (1.66) *	0.0296 (0.50)
High-ESG – Low-ESG	-0.087 %	0.0157	-0.109% (-0.86)	0.0281 (0.84)	0.0291 (0.42)	-0.1160 (-1.86) *

To understand the differences between Low-ESG portfolio and High-ESG portfolio, I perform Fama-French Three-factor-model analysis similarly to hypothesis 1. Table 13 presents the results of the regression and show that both Low-ESG and High-ESG portfolios create a positive and significant alpha at the 1% level (0.670% and 0.561%, respectively). Interestingly the market betas, volatility and the coefficient of SMB are almost the same for both portfolios. The SMB coefficients are positive signaling a slight tilt towards small-cap companies, but not statistically significant. This result is expected as companies usually improving or diminishing their ESG scores are probably smaller whereas high-cap companies retain more stable ESG ratings between consecutive years. On the other hand, the HML coefficient is 0.1456 for Low-ESG portfolio and significant at 1% level whereas the corresponding coefficient for High-ESG portfolio is close to zero. This signals that Low-ESG portfolio contains more value stocks.

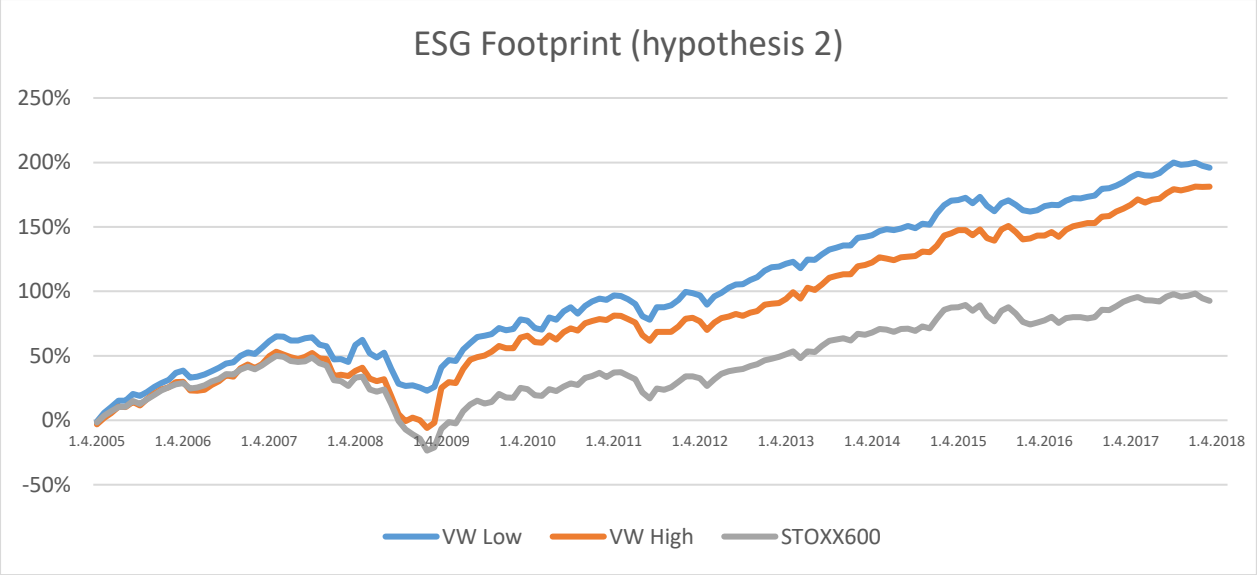

Figure 16. ESG Footprint, Hypothesis 2

Figure 16 describes the cumulative returns of portfolios constructed based on ESG footprint scores. Overall, the pattern of portfolio returns are similar to the ESG total score. There is slightly larger difference between Low-ESG and High-ESG portfolio than previously with total scores. On the next page, Table 14 presents the results of Fama-French three-factor model. Again, both portfolios create positive alphas of around 0.55-0.65% at 1% level as shown by the Table 14 below.

Table 14. ESG Footprint, Hypothesis 2

ESG Footprint (Hypothesis 2.)						
Portfolio	Avg. monthly return	Volatility	α	MRKRET-Rf	SMB	HML
Low-ESG	1.255 %	0.0419	0.693% (5.87) ***	0.9346 (29.83) ***	0.0229 (0.36)	0.0981 (1.69) *
High-ESG	1.161 %	0.0459	0.541% (4.13) ***	1.0042 (28.93) ***	0.1998 (2.81) ***	0.2032 (3.16) ***
High-ESG – Low-ESG	-0.094 %	0.0193	-0.152% (-1.00)	0.0697 (1.72) *	0.1769 (2.13) **	0.1051 (1.40) *

Based on the regression results, there are one notable difference comparing to previously presented results regarding ESG total score portfolios. The coefficients of SMB and HML are close to 0.20 and significant at 1% level for the High-ESG portfolio. This signals that there are both small-cap stocks as well as value stocks in this portfolio. Also the market beta is close to 1, indicating that the portfolio behaves similarly than the index on average.

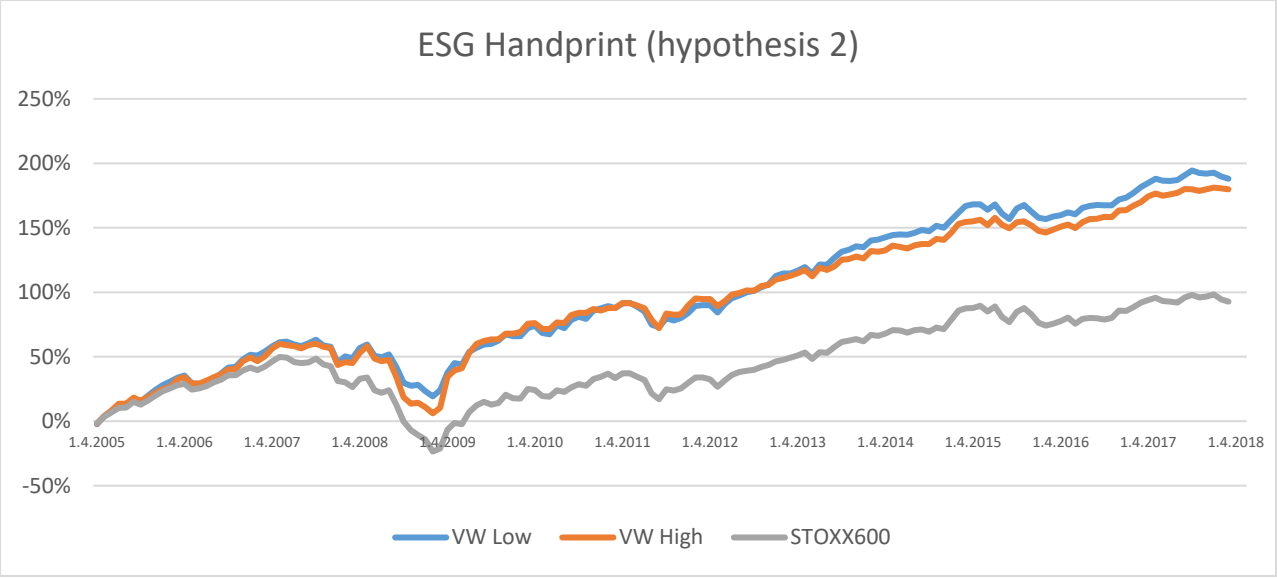

Figure 17. ESG Handprint, Hypothesis 2

Finally, regarding Hypothesis 2, the Figure 17 shows the cumulative returns of portfolios constructed based on the ESG handprint scores. Similarly than previously, Low-ESG portfolio outperform High-ESG portfolio by yielding cumulative returns of 187.9 % (High-ESG 179.8 %) and a cumulative average monthly return of 1.205 % (High-ESG 1.153 %). As the Table 15 presents, also the alphas of these portfolios are in line with the previous portfolios.

Table 15. ESG Handprint, Hypothesis 2

ESG Handprint (Hypothesis 2.)						
Portfolio	Avg. monthly return	Volatility	α	MRKRET-Rf	SMB	HML
Low-ESG	1.205 %	0.0406	0.646% (6.15) ***	0.9242 (33.13) ***	0.0253 (0.44)	0.0519 (1.00)
High-ESG	1.153 %	0.0442	0.533% (4.01) ***	0.9953 (28.25) ***	0.1962 (2.72) ***	0.0535 (0.82)
High-ESG – Low-ESG	-0.052 %	0.0176	-0.113 % (-0.81)	0.0711 (1.91) *	0.1709 (2.23) **	0.0016 (0.02)

To summarize the results of this section, the key observation is that there is no significant difference whether the portfolios are constructed based on ESG total score, ESG footprint or ESG handprint scores. The alphas and average returns of each of the portfolio are in line between all three options. Similarly to Hypothesis 1, Low-ESG portfolios outperform High-ESG portfolios in all three cases. However, now the differences is not statistically significant as was the case with Hypothesis 1. Moreover, all six portfolios create positive alpha between 0.53-0.69 per cent with 1% level outperforming the STOXX600 index significantly. Based on these findings, investors can expect positive excess returns from both sides of the momentum strategy, i.e. from those companies that improve their ESG ratings and from those companies who do the opposite. The findings regarding improving ESG ratings and positive stock market returns is in line with Nagy et al. (2016).

6.4. Hypothesis 3

Hypothesis 3 deepens the analysis of hypothesis 1 and divides the companies in the sample by assessing their performance based on both ESG footprint and handprint scores. To test hypothesis 3, I will create four portfolios, which are as following:

- (1) High handprint, high footprint
- (2) High handprint, low footprint
- (3) Low handprint, high footprint
- (4) Low footprint, low handprint

As mentioned in the chapter 6.1., the portfolio construction process of this part differs slightly compared to hypothesis 1 and hypothesis 2. To construct these portfolios, each year I first rank companies based on their ESG handprint score and divide this into two groups. Next, I divide each of these groups into two sub-groups by ranking the companies according to their footprint score.

As the amount of companies with ESG data available varies between years, this first ranking and the size of high handprint and low handprint groups are different each year. When performing the second ranking based on the footprint score, I choose each year 62 highest and 62 lowest performing companies to create the sub-groups. In this way, I am able to construct the four portfolios mentioned above and keeping the size of the portfolios constant each year.

After the selection of the companies in each portfolio, the methodology is similar to hypothesis 1 and hypothesis 2, meaning that I build value-weighted portfolios and rebalance the portfolios every 12 months in April. The sample period is similar to hypothesis 1 covering years 2004-2018.

The Figure 18 presents the cumulative returns of each of the portfolios as well as the STOX600 Europe Index returns. Similary to the hypothesis 1, the portfolio (1) containing high handprint and high footprint stocks (Hhigh, Fhigh), follows closely the STOXX 600 index. The average return of this portfolio (0.656%) is really close to the corresponding returns (0.634%) of the portfolio constructed based on highest ESG total score ratings in the hypothesis one. This is natural as both portfolios include the highest ESG rated companies. Correspondingly, the portfolio (4) containing low handprint and low footprint stocks (Hlow, Flow) yields average monthly returns of 1.103% whereas the low ESG total score portfolio in hypothesis 1 yielded 1.081%. This indicates that

portfolios (1) and (4) are quite similar to the portfolios constructed by ranking companies based on their ESG total scores. There are minor differences as the portfolios include different number of companies between hypothesis 1 (125 companies) and hypothesis 3 (62 companies).

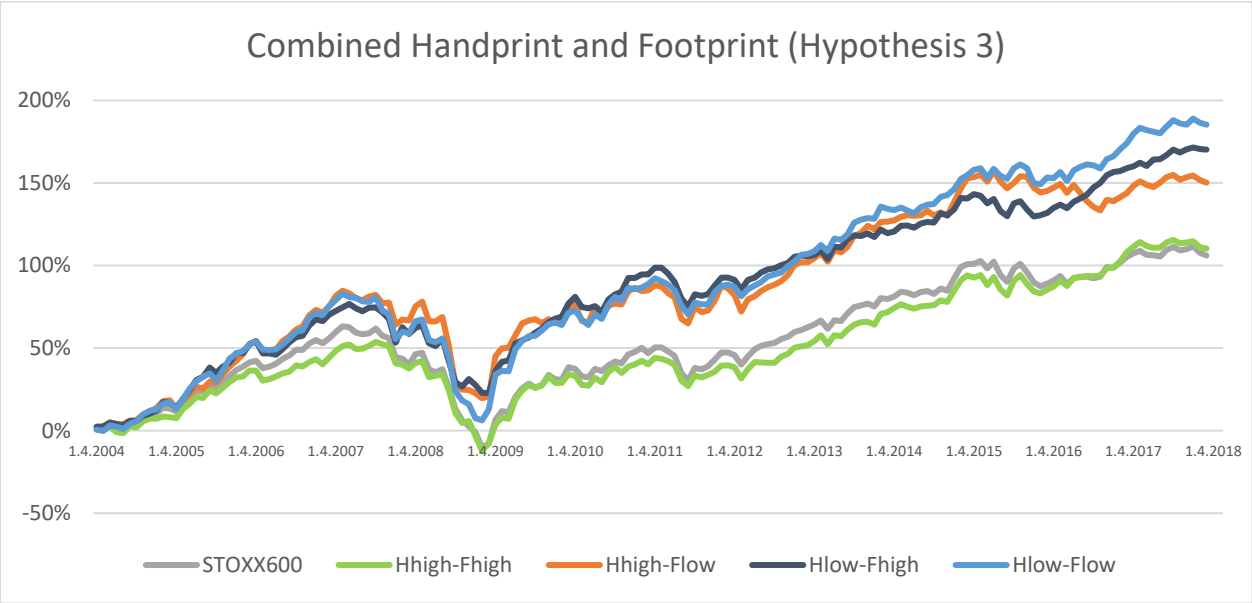

Figure 18. Combined ESG handprint and ESG footprint, Hypothesis 3

Interestingly, portfolios (2) and (3) behave more like portfolio (4) than portfolio (1). Based on the cumulative results, both of these portfolios outperform STOXX600 index significantly. As these portfolios include the stocks that rank high in either of the dimensions ESG footprint or ESG handprint and consequently low in the other dimension, they differ by the portfolios of Hypothesis 1, which were constructed based on the highest footpritn and handprint ratings. This is an interesting finding describing that investors are able to utilize ESG ratings more efficiently by analysing both the footprint and handprint dimensions parallery. The following page presents the Fama-French three-factor model results providing further evidence on the portfolio performance in the Table 16. In addition, Figure 19 summarizes the results of Hypothesis 3 by visualizing the results using the framework describing the four different categories.

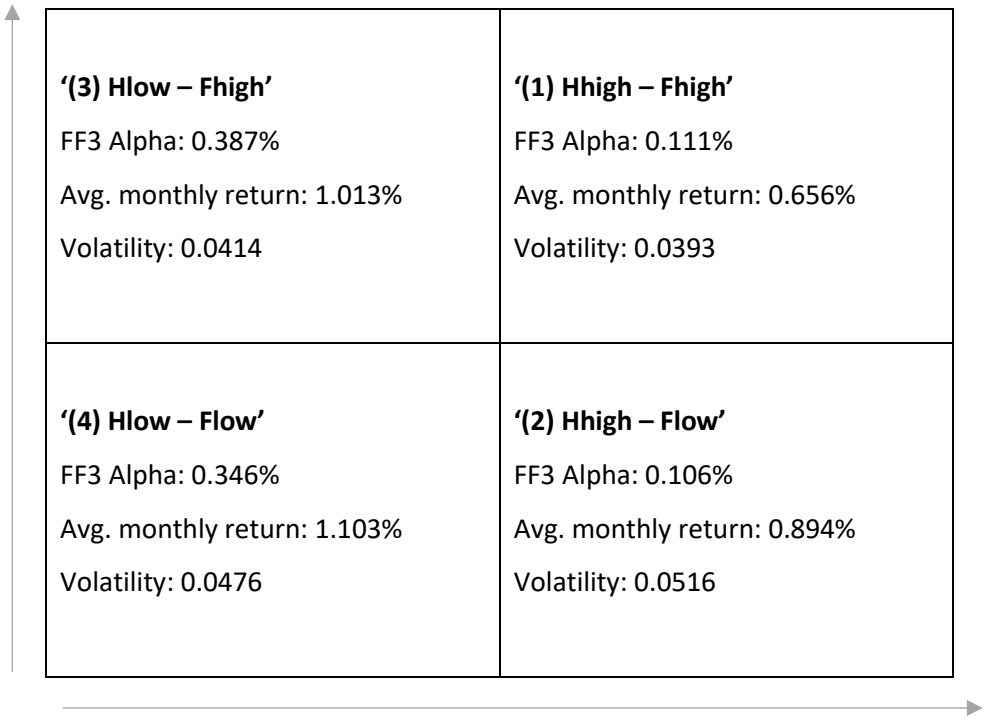

Figure 19. Summary of the Hypothesis 3 results

Table 16. ESG Combined Handprint and Footprint, Hypothesis 3

ESG Combined Handprint and Footprint (Hypothesis 3.)						
Portfolio	Avg. monthly return	Volatility	α	MRKRET-Rf	SMB	HML
1. Hhigh, Fhigh	0.656%	0.0393	0.111% (1.22)	0.9134 (36.72) ***	-0.2384 (-4.74) ***	0.0514 (1.12)
2. Hhigh, Flow	0.894%	0.0516	0.106% (0.62)	1.1409 (24.34) ***	0.4461 (4.71) ***	0.1565 (1.80) *
3. Hlow, Fhigh	1.013%	0.0414	0.387% (2.50) ***	0.9083 (21.49) ***	0.2447 (2.86) ***	0.0583 (0.75)
4. Hlow, Flow	1.103%	0.0476	0.346% (2.30) **	1.0776 (26.20) ***	0.4734 (5.70) ***	0.0859 (1.13)

When examingin only cumulative and average monthly returns, portfolio (2) containing high handprint and low footprint stocks performs almost as good as the portfolio (3) discussed before. However, there is a significant difference when comparing the volatility and the coefficients of *MRKRET-Rf*. Based on the results, portfolio (2) is clearly riskier and has a market beta of 1.14 compared to beta of 0.90 by portfolio (3). Also portfolio (4) creates a positive alpha of 0.346% with 5% level. When comparing these two portfolios, they differ clearly by their *MRKRET-Rf* coefficients. Portfolio (3) has 0.9038 coeffiecnt and portfolio (4) has 1.0776 coefficient. This indicates that portfolio (3) has more stable returns and is less riskier compared to the portfolio (4). To understand the performance of portfolios (2) and (3), Figure 19 and Table 16 provide valuable information.

When assessing the results more in detail, there are several interesting findings and conclusions to be made. First of all, there is a clear division between portfolios including stocks with high handprint scores and low handprint scores. Figure 19 presents the alphas of each of the four category, and it is easily observable that the right hand side of the framework is associated with lower excess returns (close to 0.1%) compared to the left hand side (over 0.3%). Secondly, other clear cut is made based on the values of the market beta in each of the equations. Portfolios with low footprint scores are associated with higher *MRKRET-Rf* coefficients (close to 1.1) and higher voalitility (close to 0.05), whereas portfolios including high footprint score stocks have clearly lower *MRKRET-Rf* coefficients (0.9) and lower volatility (close to 0.04). This signals, that the value protection capabilities of ESG information and less riskier stocks are linked to the ESG footprint scores, not in the ESG handprint scores. The finding is in line with my framework stating that companies focusing on the footprint do so to improve their risk management, which eventually can be seen to lead to diminished stock market returns.

Moreover, interesting interpretations can be made when examining the *SMB* coefficients of each portfolio. Again, there is a clear cut between those portfolios that include low footprint stocks and high footprint stocks. Portfolios (2) and (4) i.e. the bottom portfolios on the Y-axis have SMB coefficient over 0.4 whereas portfolios (1) and (3) has clearly smaller coefficients. Portfolio (1) is clearly tilted towards large-cap stocks and has a negative coefficient of -0.2384. As discussed earlier, this is natural as large companies tend to have higher ESG ratings. When observing portfolios (2) and (3), it can be concluded that higher footprint score is associated more towards

larger companies than higher handprint score. This is also easy to explain, as many companies with high handprint might be smaller and innovative companies, wheras higher footprint usually requires more investments and resources.

By combining the observations presented previously, it is easily observable that the portfolio (3) containing stocks with low handprint score and high footprint score is the most attractive from an investor point of view. The portfolio creates a positive alpha of 0.387% with 1% level and is the only portfolio reaching statistical signifiance at that 1% level. The coefficients of SMB and HML are 0.2447 (significant at 1% level) and 0.0583, correspondingly. This indicates that the portfolio is slighlty tilted towards small-cab stocks, but not as clearly as portfolios (2) and (4), which both have SME coefficient more than 0.44 with 1% level. As discussed previously, this portfolio contains more mature companies that have specifically invested in high ESG footprint performance in their operations.

7. CONCLUSIONS

This thesis has aimed to build a comprehensive picture of the sustainable investment, sustainable development and corporate sustainability as highly connected and important terms. These three concepts should be seen inseparable but they have been examined largely in isolation in the academic research. As noted by Linnenlucke et al. (2013), the research on sustainable investing has been isolated from the other relevant fields of studies. Also Dyllick & Muff (2016) argue that there is a missing integration and link between societal macro level and organizational micro level research. Considering these notions, I find it important to enable more collaborative approach as it is key to create a common language and understanding of the topic, and this has been one of the goals of this thesis. As our planet is facing ever threatening sustainability challenges, it will be highly needed to increase the discussion between different parties to truly form a common understanding on the challenge ahead of us as a humanity – and to decide what we want to do.

To contribute to this important discussion and to provide tools to improve the understanding and concrete actions, I have in this thesis presented the concepts of business footprint and business handprint as a complementary concepts that companies and investors should understand. My motivation to do so lies in the fact that focusing only in minimizing the negative impacts, namely the footprint, will not be enough by scale and pace to tackle the growing sustainability challenges. Indeed, we will consequently need to apply also a new mindset focusing on creating a broader positive societal impact. A root cause for the global challenges has been a questionable behavior of emphasizing short term outcomes and neglecting short term impacts. This is especially connected to externalizing the negative harms of business activities. To create a truly sustainable society, we must seek to minimize the negative impacts and maximize positive impacts of each action, whether done by individuals, companies or governments.

To my best knowledge, this paper is the first to separate business footprint and business handprint when examining the performance of sustainable investment. I build a framework presenting four different categories classified as (1) True sustainability leaders, (2) Impact leaders, (3) Operational efficiency leaders, and (4) Sustainability laggards. To test the framework presented in this thesis

empirically, I construct a sample covering companies in the STOXX600 Europe Index and utilizing a sample period covering the years from 2003 to 2018.

The main findings of the empirical part of the thesis are as follows. First, when measured by only the ESG total score, there is no evidence that higher ESG performance leads to outperformance of low performing counterparts. When constructing the portfolios based on the ESG total scores, the portfolio with highest rated companies tilts toward value stocks whereas the low scoring portfolio tilts heavily towards companies with smaller market capitalization. Affected by this strong size and value effect, the portfolio containing low ESG rated companies outperform the one with high ESG rated companies. This observation is natural as smaller companies typically do not have good ESG performance whereas the ones with high ESG performance are typically larger companies with resources to invest in developing their ESG performance.

However, from the investor point of view, it is interesting to observe that also High-ESG portfolio outperforms the market index and creates positive alpha. At the same time, High-ESG portfolio is associated to a smaller risk and thus may attract investors that value stable returns over higher returns. As was discussed in the Hypothesis 1, this finding is especially relevant regarding ESG footprint scores. By utilizing ESG footprint scores, investor will have higher alpha than by using ESG total scores. According to this observation, one of the key findings of this thesis is that investors are able to achieve a better risk-return profile for their portfolio by focusing on companies that are able to minimize the negative impacts of their operations. This is done by analyzing the companies by their ESG footprint score as presented in this thesis.

Second, this thesis provides evidence that those companies that improve their ESG performance will be rewarded by the stock market. By selecting those companies into portfolio that have increased their ESG scores the most during the previous year, will earn an alpha of around 0.5% with 1% significance level. This finding holds when using either ESG total score, ESG footprint score or ESG handprint score, and signals that increasing performance regarding ESG is linked to positive stock market performance. Overall, there is no significant difference whether the portfolios are constructed based on ESG total score, ESG footprint score or ESG handprint score. The evidence regarding Hypothesis 2 in this thesis shows that the alpha is highest when the portfolio is constructed based on the ESG total score. As this is the score that most investors and analysts are following, it might be for that reason also the most rewarding score.

Third, this thesis provides evidence that companies with higher ESG footprint score are less risky compared to those companies with low ESG footprint score. As explained by the framework presented in this thesis, companies invest into ESG footprint in order to improve their risk management. The empirical evidence provides support for this argument. On the other hand, there are no significant findings to be discussed regarding ESG handprint. Overall, it seems that handprint score does not include as valueable information as footprint score. By investing in a portfolio including high handprint and high footprint stocks, investor is able to reach an alpha of 0.1% with the lowest volatility across all four categories. On the other hand portfolio containing high handprint and low footprint stocks is the most volatile with a market beta of close to 1.14.

When assesing the results regarding four different portfolios in Hypothsis 3, I find that portfolio including stocks with high ESG footprint score and low ESG handprint score creates excess returns of 0.387% at 1% level. Other three portfolios create also a positive but insignificant excess returns. This signals that investors receive value relevant information by utilizing especially ESG data considering stocks' ESG footprint performance.

To conclude the findings from the empirical part of this thesis, there are clearly implications whether companies are analyzed based on the ESG total score, ESG handprint score, or ESG footprint score. By applying ESG information into investment analysis, investor is able to adjust own risk-return profile according to own preferences. Based on the findings, especially ESG footprint score provides value relevant information for the investors to consider as a part of their investment analysis. In the future, it will be interesting to follow how the portfolios including companies with high handprint will developed. Moreover, as currently the data availability of good handprint indicators is an issue, it remain to be seen what kind of information investors can apply to assess the handprint performance of individual stocks.

Finally, to define the future of economic system and the role of financial markets within it, is not a simple task, neither an objective of this thesis. However, as discussed in this thesis, the era of an economic system which externalizes the price of negative impacts towards the society needs to end. The human impact has exceed the planetary boundaries and without corrective actions the negative implications to the society and financial markets will be devastated. Due to growing understanding of the relationship between people and planet, different stakeholders are increasingly considering sustainability in their actions. This will directly impact the success and

performance of companies and investors. Those who are ready to enter the new world will be rewarded and those who ignore the common future, are deemed to fail. The role of forward-looking strategies, innovation and sustainability convergence, and the new business models that tackle societal challenges will attract the attention of investors and other stakeholders in the future.

As discussed in this thesis, sustainable investing has gone a long journey from its inception. I anticipate a future where a term sustainable investing would be unnecessary and the term investing would be enough. This would require that investors do not speak about financial and non-financial information when they refer to ESG. Already now progressive investors are combining material ESG information to financial information in order to create a best possible understanding of the risk-return profile of an underlying asset, and this will be the new normal.

The future research should consider developing better measures for understanding companies' long term orientation and the level of societal impact creation. Currently there are methodologies under development, which aim to assess business handprint and this will again change what kind of infromation investors demand in the future. Companies should be assessed by their net-positivity and each company should aim to create more positive impacts than they cause harm when creating that impact. Measuring that remains a challenge, but the understanding of these highly critical matters has started to cumulate with accelerating pace. As Victor Hugo has said: "Nothing is more powerful than an idea whose time has come."

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